NETWORK WORLD
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READER ADVOCACY FORCE

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Is OSI dead?

By Wayne Eckerson and
Ellen Messmer
Network World Staff

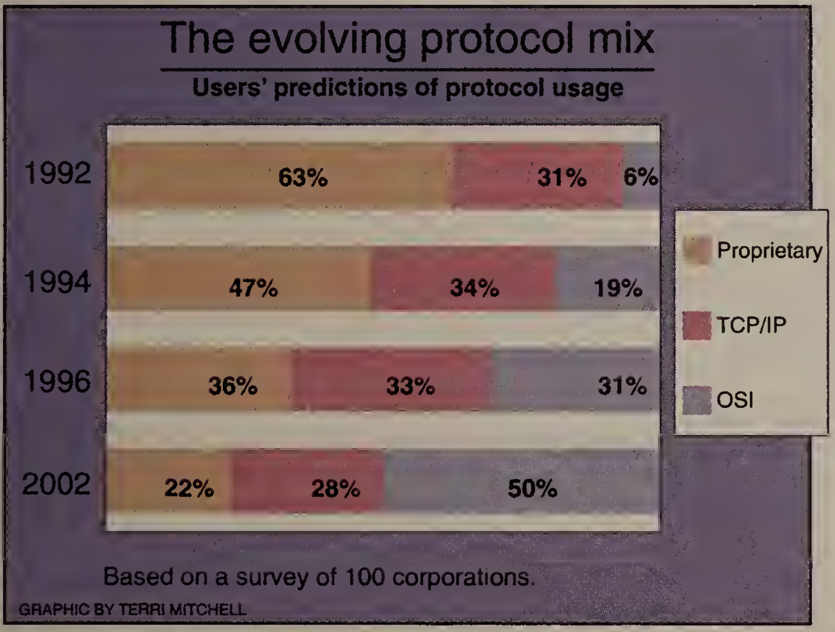
No. It just seems that way.

There is a growing perception that the OSI movement is sputtering and will soon run out of gas.

Users are frustrated by the lack of robust, interoperable and affordable Open Systems Interconnection products, and vendors are perplexed about how best to market open systems wares. Even OSI advocates have admitted in candid moments that the OSI movement seems to have stalled.

Meanwhile, the Transmission Control Protocol/Internet Protocol — which OSI was supposed to obsolete — has grown in functionality and surged in popularity. For many users, TCP/IP has become the interoperability standard of choice.

Nevertheless, some OSI standards are slowly taking hold, and user optimism about OSI is still high (see graphic above).


The evolving protocol mix

Users' predictions of protocol usage

Based on a survey of 100 corporations.

GRAPHIC BY TERRI MITCHELL

What is clear is that OSI will never dominate corporate nets as once envisioned. The evidence suggests that OSI will take its place alongside TCP/IP and proprietary protocols in user networks for at least the next decade. Coexistence will become the watchword as users struggle to achieve interoperability in a multivendor world.

These are some of the conclusions of an in-depth OSI study done over the past several months as the first project of *Network World's* new Reader Advocacy Force (see R.A.F. box, page 70), a team of reporters and editors brought together to examine the critical issues facing network users.

This report is based on interviews with prominent users, vendors and consultants in the open systems field, as well as leaders of open systems groups, vendor consortia and technical forums. It is also based on a comprehensive survey of *Network World* readers regarding obstacles facing OSI, user migration strategies and the role of TCP/IP.

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NETLINE

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NOVELL BUYS UP expertise in electronic software distribution. Page 4.

NW BULLETIN BOARD adds slew of new features for readers. Page 4.

GOING GIGABIT: IBM, Ancor Communications unite to develop products based on new gigabit-speed network standard. Page 4.

IBM TO UNVEIL TCP/IP Sockets API for CICS plus TCP/IP software for its 3172. Page 4.

CODENOLL AT WORK on first Fiber Distributed Data Interface adapter card for Macintoshes. Page 6.

NEWSPAPER

Windows gets closer ties to TCP/IP world

Vendors team on API that will ease development and use of TCP/IP applications under Windows.

By Margie Wylie
Senior Editor

SAN FRANCISCO — A new application program interface released last week could draw more Microsoft Corp. Windows users into TCP/IP nets by making it easier to create and run Windows applications that employ TCP/IP.

Created by a group of 20 vendors including Digital Equipment Corp., IBM, Novell, Inc. and SunSoft, Inc., the Windows Socket (WinSock) API will unyoke Windows applications from particular flavors of the Transmission Control Protocol/Internet Protocol. Through the API, Windows programs can call on a variety of vendors' TCP/IP services through a single interface.

TCP/IP application developers only have to create one version of their programs that can use any WinSock-compatible TCP/IP stack, whether from Frontier Technologies Corp., FTP Software, Inc., IBM, NetManage, Inc. or Novell, all of which announced support for WinSock.

"Every [TCP/IP] application vendor out there is doing six little silly bits of work for six different transports for no good reason when they could be using that

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FEATURES

BUYER'S GUIDE

- Buyer's Guide makes shopping for digital private lines easy. Page 47.
- Making sense of wireless services. Page 51.

McGowan remembered as champion of competition

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — When he left Wall Street 24 years ago to work for a small, financially strapped company called Microwave Communications, Inc., William McGowan had never seen a network diagram or stepped inside a central office.

But by the time he died of a heart attack at age 64 last week, McGowan had spearheaded a radical transformation of the U.S. telecommunications industry. The outspoken Harvard Business School graduate relentlessly chipped away at AT&T's 100-year-long monopoly, opening the way for hundreds of rivals to enter the marketplace and turning MCI into a $10 billion company.

Talk to anyone who ever encountered McGowan, and they will tell you he was a man with a mission. Even taking on the world's largest corporation, McGowan never flinched. He had a rare combination of talents that enabled him to dissect the multi-

(continued on page 73)

Banyan takes a new tack in LAN fight

By Margie Wylie
Senior Editor

WESTBOROUGH, Mass. — After years of attacking Novell, Inc.'s NetWare head on, Banyan Systems, Inc. has decided to flank its competitor by offering the best of VINES on NetWare and other LANs.

Banyan this week will announce plans to split off and sell its network services as add-ons that will not only enhance rivals' local-area networks, but also integrate disparate LANs, such as NetWare, Microsoft Corp. LAN Manager and IBM LAN Server, as well as its own VINES.

Banyan, based here, said it will eventually offer its StreetTalk directory service for other platforms. But the first step in its

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Software links disparate multivendor applications

Covia Technologies signs on IBM, Stratus, Tandem and NCR for Communications Integrator.

By Michael Cooney
Senior Editor

NEW YORK — Covia Technologies, Inc. last week announced software designed to help users link applications across distributed multivendor networks.

The company's Communications Integrator (CI) provides a set of services, including a standard application program interface (API), that let disparate applications talk as peers without worrying about the underlying communications protocols and hardware platforms.

Covia Technologies already has a number of industry heavyweights lined up to license the CI software, including IBM, Digital Equipment Corp., NCR Corp., Stratus Computer, Inc. and Tandem Computers, Inc.

CI is the first commercial product of Covia Technologies, a spin-off of airline reservation giant Covia Partnership of Rosemont, Ill.

"CI resides as an application on top of a platform's operating system and appears to other applications as the primary interface to network transport services — be they TCP/IP, LU 6.2, NETBIOS or others," said Mark

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OSF scraps plans to use IBM data engine in its DME

Says software is too complicated to integrate.

By Jim Duffy
Senior Editor

CAMBRIDGE, Mass. — The Open Software Foundation, Inc. (OSF) said last week it has scrapped plans to use IBM's data engine in the initial release of its Distributed Management Environment (DME), saying the object-oriented software was too complicated to integrate with other technologies in the systems and net management framework.

IBM's data engine was to be used along with object-oriented technology from Tivoli Systems, Inc. in the DME's object server component, which maintains objects that contain information about resources in a network, as well as routines for managing them. The objects can be accessed by management applications.

OSF said it will now rely on other components within the DME, including Tivoli technology, to fill the role planned for the data engine. However, the group has not ruled out implementing the IBM data engine in subsequent releases of DME, OSF officials said last week. The first release of the DME framework is slated for December 1993.

The IBM data engine holds ob-

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Proteon's new Phase IV pack to ease integration

By Maureen Molloy
Senior Writer

WESTBOROUGH, Mass. — Proteon, Inc. will announce today a new implementation of Digital Equipment Corp. DECnet Phase IV software for its bridge/routers that will enable users to better integrate DECnet and IBM SNA traffic.

With the new software, based on specifications provided by DEC, users will be able to ship DECnet traffic over existing token-ring internetworks that use source routing-based bridges. Previously, such nets would have to be upgraded with routers to support DECnet.

Among the new capabilities of Proteon's Phase IV software is the ability for DECnet end nodes and Proteon bridge/routers to cooperate in discovery procedures, which is the method by which a protocol determines the location of end nodes and the route by which data packets find their destination.

Info added to header

A Proteon bridge/router can now add source routing information to the header of a DECnet packet, thereby permitting DEC-

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Briefs

Cabletron to back Crescendo FDDI spec. Cabletron Systems, Inc. this week will announce it is joining forces with Crescendo Communications to back a single standard for running Fiber Distributed Data Interface over copper. Cabletron will admit that its own specification, which it proposed jointly with National Semiconductor Corp., fell short of performance expectations. The company will now back a competing specification proposed by a group led by Crescendo that includes AT&T, BT, Fibronics International, Inc. and Ungermann-Bass, Inc. ANSI's X3T9.5 FDDI Physical Media Dependent Work Group is working to select a specification that will become an industry standard.

IBM, Chipcom in talks. Chipcom Corp., a Southborough, Mass. wiring hub maker, and IBM last week issued a statement saying they "are engaged in discussions relating to multiprotocol, intelligent hub products." However, the statement said, the companies have not signed a statement of intent and there is no guarantee any transaction will take place. An IBM spokesman said the two firms will likely make a formal, more detailed announcement soon, probably a statement of direction.

If at first you don't succeed . . . NCR Corp. plans to give its System 3000 another go at local net routing by unveiling later this year or early next a routing module manufactured by Cisco Systems, Inc. NCR's previous attempt at turning the System 3000 into an Open Systems Interconnection router fell short of price and performance targets ("NCR shelves plan for key OSI router," *NW*, Oct. 14, 1991).

According to NCR officials, the new module will be a scaled down version of NCR's StarWAN Brouter Model 100, which is also manufactured by Cisco. It will forward 3,000 packet/sec, support one token-ring or Ethernet LAN port and one wide-area network port. It will support a bevy of the most popular routing and interrouter protocols and be priced around $6,000.

BBN, UB team for ATM. As expected, Ungermann-Bass, Inc. and BBN Communications Corp. last week announced a strategic partnership to jointly develop local- and wide-area network Asynchronous Transfer Mode (ATM) products capable of supporting emerging high-bandwidth multimedia applications ("UB, BBN join on ATM for Access/One, *NW*, June 8). BBN and UB will develop compatible LAN-based ATM products, such as adapter cards and hub modules, plus wide-area ATM switches. UB will sell the LAN products and both companies will market the wide-area wares.

HP, Microsoft plot E-mail driver. Microsoft Corp. and Hewlett-Packard Co. last week announced plans to integrate Microsoft Mail 3.0 with HP's OpenMail, providing a way for users of both electronic mail systems to share messages and use mail-enabled applications. The two companies will work together on a driver that connects the two messaging systems, which will enable Microsoft Mail to be a native client on the HP OpenMail messaging backbone. The driver is expected to be available in the fourth quarter of this year from both companies.

McData trims down. McData Corp. of Broomfield, Colo., Thursday cut 62 employees from its 321-person work force. The company blamed the 19% employee cut on the controller market dropping "more rapidly than anyone had anticipated."

CONTACTS

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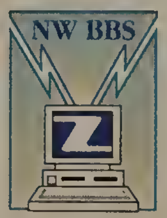
We want to hear from you. *Network World* has set up a toll-free number you can use to leave news tips or letters to the editor. Let us know what's going on or how you feel about the stories you read in our publication by calling (800) 622-1108, Ext. 487.



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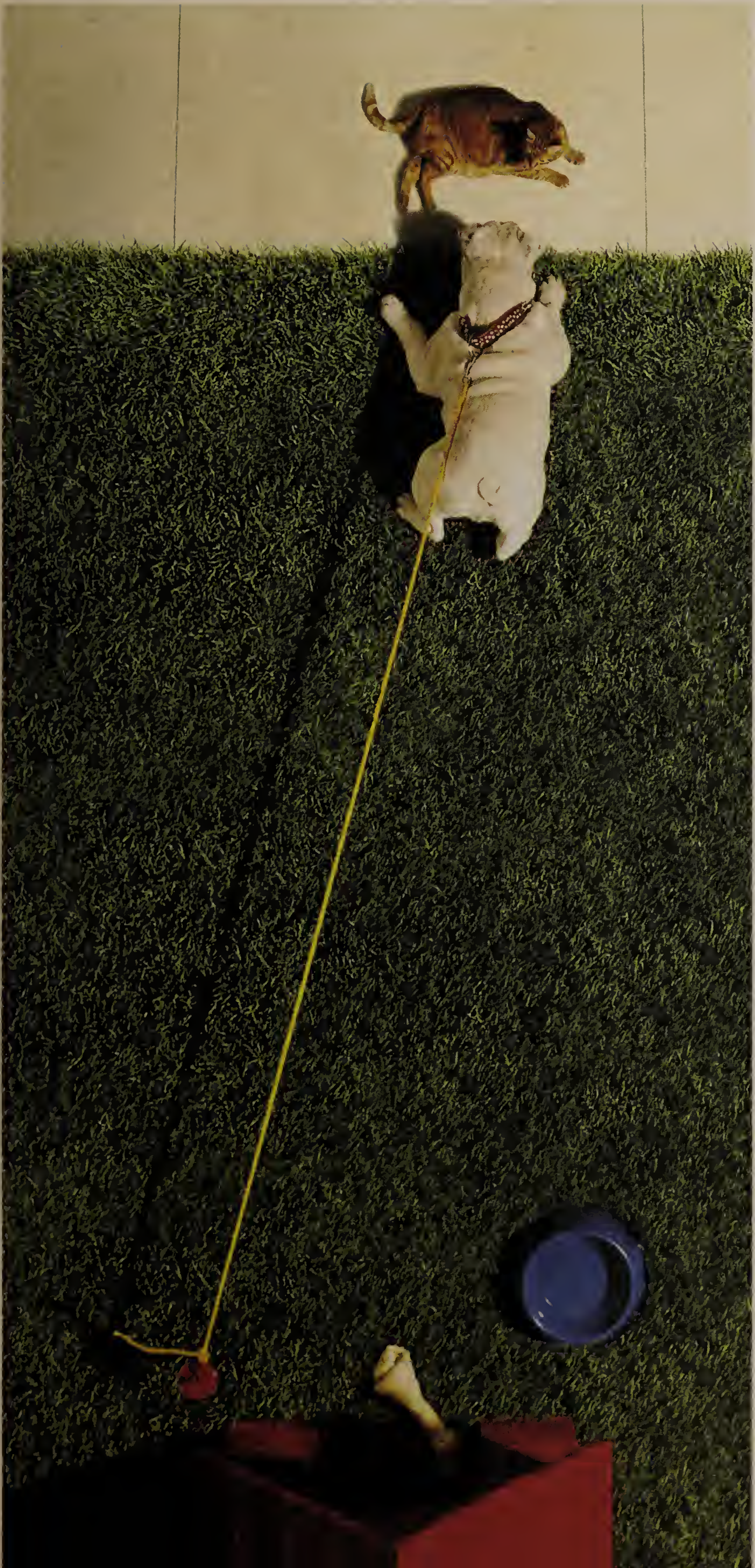

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Concord's Trakker monitor to handle new applications

Tools will aid in capacity planning, other functions.

By Bob Brown
Senior Editor

MARLBOROUGH, Mass. — Concord Communications, Inc. this month is expected to announce a new capacity planning application that runs on SunConnect's SunNet Manager and works hand in hand with Concord's Trakker internetwork monitor.

The application, dubbed Dialogue Tool, is designed to provide detailed information about individual network usage patterns. Armed with this information, administrators can make better decisions about capacity planning, such as how to segment nets and where to deploy internetwork equipment such as routers.

Concord worked with Chevron Information Technologies, Inc., a Trakker customer, to build the application to help perform load balancing on five Ethernet local-area networks at a Chevron facility in Houston, said J.D. Flack, a systems analyst at Chevron.

However, the application will be available later this month to all Trakker users at no extra cost. It will be the first in a series of new Trakker applications, including those for inventory management and security, that Concord will discuss further this summer.

Trakker consists of two components — a segment monitor and a central management console. The segment monitor is a Reduced Instruction Set Computing device that resides on a network segment and captures information about net traffic in real time. Using the Simple Network Management Protocol, it passes that data to the Trakker console on the SunNet Manager platform.

The Dialogue Tool, which is accessed from the central management console, has three components: Volume Leader, Node Summary and Group Summary.

Volume Leader gives net managers a list of all network sessions, in order of length, that occur during a predefined period. That helps administrators pinpoint the heaviest users and spot potential bottlenecks.

Node Summary is designed to

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Novell set to buy software distribution tool company

By Bob Brown
Senior Editor

PROVO, Utah — Novell, Inc. last week announced plans to buy Annatek Systems, Inc., a maker of automated software distribution tools, for $10 million in cash.

Separately, Novell signed a broad agreement with Ing. C. Olivetti & Co., S.p.A. of Italy under which the big European computer maker has licensed Novell's NetWare for Unix to run on its servers and will sell Novell products, among other things, via its direct and indirect sales channels.

With its proposed acquisition of Annatek, which is expected to be completed in a few weeks, Novell plans to offer products that enable NetWare servers to manage the distribution of software to desktop computers, a Novell spokesman said. This would make it easier for users with large interconnected local-area nets to handle the arduous task of distributing new and upgraded copies of multiple software packages and help cut administrative costs.

Annatek, a nine-year-old Boulder, Colo., firm, sells a series of products — the Network Navigator line — that enable users to centrally manage software distribution, installation, updating, version tracking and event scheduling among mainframes, servers and desktop clients. The Network Navigator line has consisted largely of mainframe-based software used to manage software on microcomputers.

These products will continue to be developed and supported within Novell's NetWare Systems Group, of which Annatek will become a part. Novell will use Annatek's technology, along with development work already going on within the company, to ultimately deliver a NetWare Loadable Module (NLM) for automated software distribution, the Novell spokesman said. A non-NLM product in the interim is also a possibility, he said.

It is not clear how the software distribution products will fit into Novell's NetWare Management System strategy at this point, he added. Senior Novell and Annatek executives were not available for comment.

Jamie Lewis, vice-president of information services at The Bur-

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IBM hosts, controllers to get new TCP/IP features

By Michael Cooney
Senior Editor

NEW YORK — IBM this week will roll out new Transmission Control Protocol/Internet Protocol features for its mainframe and controller products.

For the mainframe, the company will announce a CICS interface to the TCP/IP Sockets application program interface standard. The company is also expected to formally announce its TCP/IP Offload Facility, which off-loads TCP/IP processing from a mainframe to its 3172 Interconnect Controller ("IBM set to off-load TCP/IP chores from mainframes," *NW*, May 25).

The new products will solidify IBM's TCP/IP product line while giving TCP/IP users products they can actually use, rather than the sometimes difficult-to-use and inefficient TCP/IP products of the past, according to analysts.

The Sockets interface will give users in TCP/IP environments direct access to CICS applications on Systems Network Architecture-based hosts. Complicated emulation routines are currently required to access CICS applications from TCP/IP, analysts said.

Sockets is a TCP/IP interface that sets up, in SNA parlance, a session between two devices on a TCP/IP net. "IBM is now starting to ramp up their support of TCP/IP on the mainframe," said Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J. "Sockets support is an extension of IBM's promise to let a variety of protocols have access to SNA-based resources."

It is also part of IBM's strategy to decouple applications from the underlying transport protocols, analysts said. IBM would not comment on how the Sockets interface could be used with existing CICS applications.

Nolle said the Sockets support also gets IBM's foot in the door of Portable Operating System Interface (POSIX) compliance because all POSIX communications applications will have a Sockets

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IBM and Ancor to develop gigabit network products

By Caryn Gillooly
Senior Editor

WHITE PLAINS, N.Y. — IBM and Ancor Communications, Inc. last week announced an agreement to jointly develop products based on an emerging standard for gigabit-speed networking of devices in a local environment.

The technology, called the Fibre Channel Standard (FCS), defines a point-to-point connection over fiber-optic cabling at up to 1G bit/sec — 10 times faster than the Fiber Distributed Data Interface.

The emerging standard is a highly specialized technology, primarily designed for users supporting very high-end engineering and scientific applications. Users in these types of environments will be able to tie together workstations using FCS for high-speed distributed processing and multiprocessing.

FCS can also be used as a backbone technology, linking machines in a campus through a central switching device, according to Joe Mathis, senior technical staff member of IBM's Advanced Workstation Division in Austin, Texas, and one of the technical editors of the FCS architecture.

Under the agreement, IBM and Ancor will jointly develop hardware and software components that support FCS. The first product to result from the agreement will be an adapter card for IBM's RISC System/6000 workstation that IBM officials said should be in beta test by year end.

The IBM adapter card will use Ancor's circuit exchange terminal technology and enable one workstation to forge a direct, high-speed connection with another machine equipped with a similar adapter.

The two machines will be able to share work on the same task, providing the distributed, parallel processing needed for many of today's highest end applications.

In another scenario, FCS-ready workstations could be connected to Ancor's Circuit Exchange Switch (CES) in a logical star configuration. Acting as a sort of matrix switch, the CES would provide direct connections between machines as requested.

In a backbone scenario, different local-area network servers, mainframes or other devices could be directly connected to the switch, basically providing a 1G bit/sec campus backbone.

"LAN technology today is all based on shared media. You have to have a token or wait for the line to clear to send a message," Mathis said. "Even with FDDI, you have to serialize conversations. With FCS, if you have 100 workstations in a cluster, you could have 50 simultaneous conversations. You can create clusters of RS/6000s and provide a parallel

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New options for NW BBS

By Jeff Pennett
Network World IS Director

Network World last week enhanced its electronic bulletin board system (BBS) by adding support for product demonstration software, new information files and an electronic mail hot line for the publication's Reader Advocacy Force (R.A.F.).

The three options join existing features which include the Open Forum, used by readers to exchange technology and product experiences, and Networking Careers On-line, an on-line listing of jobs plus a forum linking employers and employees.

The demonstration software can be found under the existing download menu listing, which offers callers access to a number of shareware programs. With this new capability, users will be able to download demonstration copies of applications offered by *Network World* advertisers.

The first products available include new versions of Lotus Development Corp.'s cc:Mail for DOS and cc:Mail for Windows, and Communications Devices, Inc.'s Network Windows package for Network Management. More software will be added in the near future, including a copy of Lotus Notes.

Also new is the R.A.F. hot line, where subscribers will be able to submit ideas in private about critical network issues. We'll investigate all tips, and if we write about them, we'll send you a T-shirt with the *Network World* R.A.F. logo.

Finally, the User Utility and Information File areas have been enhanced with a newly updated index to *Network World* Buyer's Guides from 1989 to the present and a new calendar listing upcoming network trade shows and events. For directions on how to contact the BBS, see the bottom of page 2.

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Univel's NetWare version of Unix set for its debut

By Bob Brown
Senior Editor

SAN JOSE, Calif. — Univel, a joint venture between Novell, Inc. and Unix System Laboratories (USL), Inc., last week detailed plans for its long-awaited NetWare-ready version of Unix.

Those disclosures set the stage for this week's planned announcements by USL, the AT&T spin-off that will unveil a user-friendly version of Unix System V Release 4.2 (SVR4.2) and a plan to spur broader commercial acceptance of Unix.

Among other things, USL will reveal a Unix SVR4.2 branding and certification program, a partnership with the Open Software Foundation, Inc., and a new on-line directory of Unix vendors and products called Unilinx.

"It's not as if we're trying to jump-start a dying Unix market — the Unix market is growing by 35% a year," said Joel Applebaum, president and chief executive officer of Univel, based here. "What Univel and USL are trying to do is take the momentum in the Unix market and open the floodgates to let it flow."

John Mayer, director of computing services at Chicago-Kent School of Law, a user of Novell, Inc. NetWare and Unix systems, is enthusiastic about UnixWare. "Anything that better integrates Unix and NetWare should make my job easier in the long run."

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AT&T pack lets 5ESS switch support NX64 services

By Bob Wallace
Senior Editor

MORRISTOWN, N.J. — AT&T Network Systems last week announced new software for its flagship 5ESS central office switch that will enable carriers to offer on-demand switched services at speeds up to T-1.

The software, available early next year, will enable local telephone companies to support so-called NX64 switched data services that dynamically aggregate multiple 64K bit/sec channels into a high-speed switched data pipe.

The services will likely be less expensive and more flexible than private lines for applications such as local-area network interconnection, disaster recovery and videoconferencing.

"NX64 services will change the way users build nets," said Steve Taylor, president of Distributed Networking Associates, a Greensboro, N.C., consultancy.

"Most RBHCs don't currently offer anything between switched 56 and T-1, which seriously limits options in data network design and optimization," he said.

"We anticipate strong user demand for NX64 services," said Bob Welch, senior product planner with AT&T's technical sales support group. "The local telcos will probably have all the interest they can handle."

Under the AT&T plan, a network access device — which could be a T-1 multiplexer, inverse multiplexer, private branch exchange or coder/decoder — would need to be equipped with an Integrated Services Digital Network Primary Rate Interface (PRI) to use the high-speed switched services.

The device would transmit a message with the telephone number of the remote site and the number of 64K bit/sec channels needed to support the application. The message would then be transmitted over the PRI link's D signaling channel to the 5ESS.

The 5ESS would establish the number of 64K bit/sec channels needed to support the application. Channels could be added or dropped from the switched link as needed. With NX64, the channels would almost always take different paths through the carrier's network and be reassembled at the receiving end.

That differs from multirate ISDN service, which can dynamically establish a single contiguous pipe of bandwidth across the carrier net. Northern Telecom, Inc. recently announced plans to develop software that supports multirate ISDN ("NTI switches get multirate ISDN support," *NW,* June 1).

Software links applications

continued from page 2

Teflian, company president.

"The complexity of the underlying protocol stack is hidden from the developer, so, for example, an LU 6.2 application that may have taken months to develop now can be done in a few days," he said.

Once loaded on the systems to be networked, CI provides peer-to-peer message routing, message prioritization, load distribution, data traffic load balancing and end-to-end node flow control. Non-CI nodes can enter a CI network through a gateway application provided by Covia Technologies.

CI is layered software with the Protocol Stack API at the bottom layer providing the interface to multiple underlying transport protocols, the core CI kernel in the middle providing queuing, load distribution and a myriad of other services and the CIAPI at the top.

The CIAPI contains four verbs developers can write to — send, receive, register and unregister. In most cases, developers will only have to use the send and receive verbs, according to Teflian.

PHOTO ©1992 DANILLE SWICK

Mark Teflian

Analysts noted that CI is the first middleware product that addresses application interoperability from the mainframe down. Analysts say middleware is software that resides between the transport and application layers in a protocol stack and hides the complexities of the network from the application.

Two other companies — PeerLogic, Inc. and Netwise, Inc. — offer similar products, analysts said.

"Both companies tend to focus on the LAN. Covia starts at the mainframe and moves down," said Larry DeBoever, managing director of Tucker/DeBoever Technologies, a consulting firm in South Norwalk, Conn.

"Covia's announcement is important because it lets users keep their embedded protocol stacks and communicate with applications they couldn't reach before," DeBoever said. "The other key is that this product is available to do this today."

Other analysts said many large companies have had to figure out on their own how to communicate across disparate plat-

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Codenoll to unveil FDDI for the Mac

By Caryn Gillooly
Senior Editor

YONKERS, N.Y. — Codenoll Technology Corp. is expected to bring out in August the industry's first FDDI adapter card for Macintoshes.

The Fiber Distributed Data Interface card could be used to bring 100M bit/sec transmission speeds to Macintosh users' desktops or to link Macintosh local-area networks directly to corporate FDDI backbones — nets that Macintosh users currently can't access without a bridge or router.

Codenoll, based here, would not confirm the upcoming announcement, but Brian Ramsey, director of marketing, said development of an FDDI card for the Macintosh would be a logical step in the company's FDDI strategy.

"The Macintosh is an exciting platform in terms of publication and multimedia capabilities," Ramsey said. "The Macintosh does a lot of color processing and image scanning, which create massive files." He said a Macintosh FDDI link would be particularly useful for users of Apple's QuickTime, a video capability included in the Macintosh's System 7 operating system.

Some analysts praised the pending move by Codenoll.

"Macintosh nets [are] used for publishing and [similar] applications," said Barry Gilbert, industry analyst at Computer Intelligence, Inc. in Acton, Mass. "With a lot of activity, those applications can really bog down the network."

Other sources, however, said FDDI was simply not necessary yet for Macintosh users.

"I don't think there are hundreds of thousands of users waiting at the door for this," said Pieter Hartsook, editor of "The Hartsook Letter," a Macintosh market research service based in Alameda, Calif. "There could be a conceivable need in two years if, for example, people start buying into full-motion video to the desktop, but certainly not now."

Other analysts agreed. "I just don't understand the need for FDDI to the desk at all — it's a backbone technology," said Jamie Lewis, analyst at The Burton Group in Salt Lake City. Lewis acknowledged that desktop video will put a greater strain on nets, but said workstations aren't really equipped for FDDI's speed.

"There's no question that video will be important to some people, but PC busses max out at 16M bit/sec token ring, much less FDDI," he said. "It would be like trying to get a drink of water from Niagara Falls."

Ramsey defended Codenoll's position, tipping the company's hand and virtually confirming the pending announcement. "The new architecture we're developing is being designed with an awareness of the strengths and weaknesses of the Macintosh," he said. Ramsey added that FDDI for the Macintosh will be even more of an issue as Apple brings out its PowerPC and other higher end products.

Ramsey declined to give pricing or availability information.

Novell set to buy tool company

continued from page 4

ton Group, a Salt Lake City consulting firm, applauded the acquisition.

"Software distribution and license management are going to be key components of network management products in the '90s," Lewis said.

William Kirwin, vice-president of the PC Policies & Strategies group at Gartner Group, Inc., a Stamford, Conn., market research firm, agreed.

"Users trying to do client/server application development are facing a critical problem with software distribution," Kirwin said. "There are literally thousands of PCs, and the frequency with which you have to update the code on the PCs is increasing dramatically. And when you're doing client/server, synchronization of the code becomes more critical."

Kirwin estimated that during the next few years, the market for software distribution tools could grow to more than six times its current level of around $50 million a year. IBM, Hewlett-Packard Co. and others have already begun to address this market.

Novell teams with Olivetti

In addition to news of its deal with Annatek, Novell last week entered into a broad technology and marketing agreement with Olivetti.

Olivetti will license Novell's NetWare for Unix and port it to Unix SVR4, Olivetti's primary server operating system. Olivetti also will include Novell's System Fault Tolerant III technology on selected Olivetti servers.

Olivetti also is joining Novell's Technical Support Alliance, a multivendor service and support team, and will train its worldwide sales and support staff to support the distribution of Novell products.

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Proteon's Phase IV to ease integration

continued from page 2

net traffic to be bridged through source routing networks.

Another key feature of the new protocol implementation is the ability for a Proteon p4100+ and CNX 500 bridge/router to set a locally administered address on DECnet packets, which makes them compatible with the IBM addressing scheme used with source route bridging.

In IBM environments, each end node must have an independent address in order to access an IBM host or utilize protocols such as the Network Basic I/O System. This capability is necessary for IBM Token Ring-attached end nodes to communicate with an IBM mainframe or be manageable from IBM's NetView or LAN Manager.

The addition of this IBM addressing scheme to DECnet packets enables DECnet data to flow over source-routed nets.

User looks to new protocol

According to Joe Carella, a senior data communications consultant at Johnson & Johnson's Consumer Products, Inc. division in Skillman, N.J., the new protocol will significantly enhance connectivity in his network by enabling the company to integrate its DECnet traffic with its Novell, Inc. NetWare and Systems Network Architecture traffic.

Johnson & Johnson recently decided to convert its mission-critical applications to a DEC VAX platform, even though the company has more than 1,000 nodes on token-ring local-area networks tied together by IBM Token-Ring Network bridges using the source routing protocol.

The company also has DEC VAXes on an Ethernet-based DECnet, which it needed to tie into the IBM Token-Ring internet. It accomplished that by forging a link between the two environments using a Proteon CNX 500 bridge/router outfitted with the new DECnet Phase IV software.

The role of the CNX 500

The CNX 500 attaches source routing headers to DECnet packets, allowing them to traverse the IBM Token-Ring internet, enabling users on those Token Rings to access VAX applications. The new implementation also enables DECnet nodes to be placed on the Token-Ring LANs.

According to Carella, this is a much more cost-effective solution than having to replace all the source routing bridges in his net with routers.

The new DECnet Phase IV implementation will be available this summer as a free software upgrade to users under Proteon's maintenance plan.

Banyan takes a new tack in LAN fight

continued from page 1

strategy will be the introduction of an enhanced version of its messaging service — the Intelligent Messaging Service — that will be rolled out for multiple platforms.

The first iteration of the Intelligent Messaging Service, due in early July for $1,495 per server, will still run under VINES and look similar to the VINES Mail on which it is based. Version 1.0 will offer multithreading for better performance, auto compression to send large messages more efficiently and new management utilities that let managers keep up with the flow and volume of electronic mail.

It can also work with Beyond Mail, Inc.'s Beyond Mail front end and Lotus Development Corp.'s cc:Mail clients.

Future versions will run on other platforms besides VINES, work with any mail client that supports an industry-standard interface and offer access to multiple E-mail back ends, including X.400 and the Simple Mail Transfer Protocol.

Sources said Banyan is already showing working prototypes of StreetTalk, code-named Ivy, that tie NetWare, LAN Manager and VINES nets.

United distributed directory services is a goal that Novell and Microsoft are working toward. If Banyan can get its technology out first, it would be in a good position to offer users the interoperability crucial to creating applications that span the enterprise. If successful, Ivy could put Banyan in control of the services and applications users will purchase, analysts said.

"Novell's theory is that if they own directory services, they own the [LAN] business," said Nancy McSharry, a Mountain View, Calif.-based analyst at International Data Corp. But Novell will not offer full directory services until NetWare 4.0 ships later this year, and even then, the directory services will not span its entire line.

Ivy is expected to work with NetWare 2.X, 3.X and 4.X. But users and analysts wonder if Banyan, known more for its technology than marketing savvy, can pull it off. "Timing is crucial in the third-party environment," McSharry said. "How you sell is as important as what you sell."

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TA120	Terminal Adapter	2 Ch. @ 64K 1 Ch. @ 16K	ISDN	Supports Voice & Data
TA/DL	Terminal Adapter	1 Ch. @ 64K 1 Ch. @ 16K	ISDN	X.25 PAD, Soft Upgrade
TA220	Terminal Adapter	2 Ch. @ 64K 1 Ch. @ 16K	ISDN	Combines "B" Channels
D56	DSU/CSU	56 Kbps	DDS	Low Cost 56K Sync.
DDS/MR1	DSU/CSU	56 Kbps	DDS	All DDS Rates
DDS/MR2	DSU/CSU	56 Kbps	DDS	DDS with Sec. Channel
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1 Industry: (check one only)

01 ☐ Manufacturers (other than computer/communications)
02 ☐ Finance/Banking
03 ☐ Insurance
04 ☐ Real Estate
05 ☐ Healthcare Services
06. ☐ Legal
07 ☐ Hospitality
08 ☐ Retail/Wholesale Trade
09 ☐ Transportation
10 ☐ Utilities
11. ☐ Education
12. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
13. ☐ Government State/Local
14 ☐ Government Federal
15. ☐ Military
16. ☐ Aerospace
17. ☐ Consultants (Independent)
18 ☐ Carriers
19 ☐ Interconnects
20. ☐ Manufacturers (Computer/Communications)
21. ☐ VAR/VAD/Systems House
22. ☐ Distributor, Computer Related
23. ☐ Distributor, Communications Related
24 ☐ Other ____________

2 What is your job function? (check one only)

NETWORKING MANAGEMENT
1. ☐ Networking Mgmt
2. ☐ LAN Mgmt
3. ☐ Datacom/Telecom Mgmt
4 ☐ Engineering Mgmt

MIS MANAGEMENT
5. ☐ MIS, IS, IT, Mgmt
6 ☐ Engineering Mgmt

CORPORATE MANAGEMENT
7. ☐ Corporate Mgmt (CIO, CEO, Pres, VP, Dir, Mgr, Financial Mgmt)

8. ☐ Consultant (Independent)

9. ☐ Other ____________

3 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2 ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1

4 Check all that apply in columns A and B:
A. I am involved in the purchase of the following products/services.
B· I plan to purchase the following products/services in the next 12 months.

	Involved A	Plan to Purchase B	
	A	B	**LOCAL-AREA NETWORKS**
01.	☐	☐	Local-Area Networks
02.	☐	☐	LAN Servers
03.	☐	☐	LAN Operating Systems Software
04	☐	☐	Superservers
05	☐	☐	Data Base Servers (Oracle, Sybase, etc)
06.	☐	☐	Terminal Servers
07.	☐	☐	LAN Services
08.	☐	☐	LAN Storage Devices (Optical, Tape, Disk, Etc. including Backup Systems)
09	☐	☐	Network Test Equipment
10.	☐	☐	Hubs
11.	☐	☐	Cables, Connectors, Baluns
12.	☐	☐	UPS
13.	☐	☐	Network Adapter Boards
14	☐	☐	Central Office LANs
15.	☐	☐	Wireless LANs
16.	☐	☐	SNMP Network Management
	A	B	**INTERNETWORKING**
17.	☐	☐	Bridges
18	☐	☐	Routers
19.	☐	☐	Gateways
20	☐	☐	Bridge/Router
21.	☐	☐	Hubs
22.	☐	☐	Intelligent Hubs
23.	☐	☐	Communications Servers
	A	B	**COMPUTERS/PERIPHERALS**
24	☐	☐	Micros/PCs
25.	☐	☐	Minis
26.	☐	☐	Mainframes
27.	☐	☐	Laptops
28.	☐	☐	Workstations
29.	☐	☐	Image Processing Workstations
30.	☐	☐	Front-End Processors
31.	☐	☐	Terminals
32.	☐	☐	Printers
33.	☐	☐	Cluster Controllers
34.	☐	☐	Fax Machines
	A	B	**SOFTWARE**
35.	☐	☐	Network Management
36.	☐	☐	Micro to Mainframe
37.	☐	☐	Network Security
38.	☐	☐	Call Accounting
39	☐	☐	Communication
40	☐	☐	Word Processing
41.	☐	☐	Data Base Management
42.	☐	☐	Spreadsheet
43.	☐	☐	Groupware
44	☐	☐	EDI
45.	☐	☐	E-Mail
46.	☐	☐	Windows/Graphical User Interface
47.	☐	☐	4-GL
48.	☐	☐	Multimedia
49.	☐	☐	Graphics
	A	B	**WIDE-AREA NETWORK EQUIPMENT/SERVICES**
50.	☐	☐	Modems (9.6kbps and over)
51.	☐	☐	Modems (under 9.6kbps)
52.	☐	☐	T-1
53.	☐	☐	T-3
54	☐	☐	Fractional T-1
55.	☐	☐	Data Switches
56.	☐	☐	Matrix Switches
57.	☐	☐	Packet Switching
58	☐	☐	Protocol Converters
59	☐	☐	Network Management Systems
60.	☐	☐	Terminal Emulation Boards
61	☐	☐	Diagnostic/Test Equipment
62.	☐	☐	DSU/CSU
63	☐	☐	Data Compression Equipment
64	☐	☐	Microwave
65.	☐	☐	Fax Boards
66	☐	☐	VSAT
67	☐	☐	Fiber Optic
68	☐	☐	Satellite
69	☐	☐	ISDN
70	☐	☐	PBXs (over 1000 lines)
71	☐	☐	PBXs (200 - 1000 lines)
72.	☐	☐	PBXs (under 200 lines)
73.	☐	☐	Automatic Call Distributors
74	☐	☐	Voice Messaging Systems
75.	☐	☐	Videoconferencing Systems
76.	☐	☐	Central Office Switch
77.	☐	☐	Voice Response/Processing
78	☐	☐	Switched Voice
79	☐	☐	Dedicated Leased Line
80.	☐	☐	Digital Data
81.	☐	☐	Switched Data
82.	☐	☐	Centrex
83	☐	☐	On-Line Information
84.	☐	☐	E-Mail
85.	☐	☐	SMDS
86.	☐	☐	Image Processing
87.	☐	☐	Audio Teleconferencing
88	☐	☐	Local Services
89	☐	☐	WATS MTs
90.	☐	☐	International
91.	☐	☐	Virtual Networks
92.	☐	☐	Frame Relay
XX.	☐	☐	None of the above

5 What are your primary responsibilities? (check all that apply)

1. ☐ LANs
2. ☐ Internetworking
3. ☐ WANs

6 What is the scope of your involvement in purchase decisions for Network products & services? (check one only)

1. ☐ Enterprisewide (Organization/Subsidiary/Division)
2 ☐ Multienterprise (Consultants)
3 ☐ Departmentwide

7 Is your network: (check all that apply)

LOCAL AREA NETWORKS
1 ☐ Local (within building)
2. ☐ Local (in a campus environment)

WIDE AREA NETWORKS
3. ☐ International
4 ☐ National
5. ☐ Regional (several states)
6. ☐ Metropolitan

8 Which of the following network architectures/protocols are used? (check all that apply)

01. ☐ SNA
02. ☐ DECNET
03. ☐ OSI
04 ☐ GOSIP
05 ☐ MAP/TOP
06. ☐ TCP/IP
07 ☐ DCA (Unisys)
08. ☐ X.25
09. ☐ NOVELL IPX/SPX
10. ☐ APPC/APPN/LU 6.2
11. ☐ NETBIOS
12. ☐ DEC LAT
13. ☐ APPLETALK
14 ☐ OTHER

9 What is your LAN Operating System? (check all that apply)

01. ☐ LOCALTALK (APPLETALK)
02. ☐ BANYAN (VINES)
03 ☐ DCA (IRMALAN)
04 ☐ IBM (LAN SERVER)
05 ☐ IBM (PC LAN PROGRAM)
06 ☐ MICROSOFT (LAN MANAGER)
07 ☐ UNGERMANN-BASS
08. ☐ NOVELL (NETWARE, 2.X, 3.X)
09 ☐ PROTEON (PRONET)
10 ☐ SITKA (TOPS)
11 ☐ 3COM (3+ . 3+OPEN)
12 ☐ Other ____________

10 What is your LAN environment? (check all that apply)

1. ☐ 4M TOKEN RING
2. ☐ 16M TOKEN RING
3. ☐ ARCNET
4 ☐ ETHERNET
5. ☐ STARLAN
6. ☐ FDDI
7. ☐ LOCALTALK
8 ☐ 10BASE-T
9. ☐ OTHER ____________

11 Are you involved in the implementation of client/server applications?

Yes ☐ No ☐

12 Which operating system do you utilize? (check all that apply)

01 ☐ DOS
02 ☐ UNIX/XENIX
03. ☐ OS/2
04 ☐ OS/2 EX. ED.
05. ☐ MVS
06. ☐ VM
07. ☐ VMS
08. ☐ NUBUS
09. ☐ WINDOWS
10. ☐ OTHER

13 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3 ☐ South America
4. ☐ Australia
5. ☐ Middle East

14 Which of the following vendors equipment do you currently have installed in your network? (check all that apply)

Vendor	Mainframes A	Minis B
01. DEC	☐	☐
02 IBM	☐	☐
03 AMDAHL	☐	☐
04 AT&T	☐	☐
05. BULL HNIS	☐	☐
06 NCR	☐	☐
07 DATA GENERAL	☐	☐
08 WANG	☐	☐
09 HEWLETT-PACKARD	☐	☐
10 PRIME	☐	☐
11 TANDEM	☐	☐
12 UNISYS	☐	☐
13 CONTROL DATA	☐	☐
14 OTHER	☐	☐

15 Please indicate the number of Microcomputers Workstations:
A Presently installed in your network
B The approximate quantity you plan to install in the next 12 months.

Micros/Workstations	Presently Installed A	Plan t Instal Next 1 Month B
1 Macintosh		
2. PCs Based on 80586 Chips	XXXX	
3 PCs Based on 80486 Chips		
4 PCs Based on 80386 Chips		
5 PCs Based on 80286 Chips		
6 PCs Based on 8086/8088 Chips		
7 Risc-Based Workstations		
8. Unix-Based Workstations		

Use Numbers Only

16 Estimated value of networking equipment and services:
A. Which you helped specify, recommend or approved in the last 12 months?
B Which you plan to help specify, recommend or approve in the next 12 months?

	A	B	
1	☐	☐	$100 million and over
2	☐	☐	$50 - $99 9 million
3	☐	☐	$25 - $49 9 million
4	☐	☐	$20 - $24.9 million
5	☐	☐	$10 - $19 9 million
6	☐	☐	$5 - $9 9 million
7.	☐	☐	$1 - $4 9 million
8	☐	☐	$500,000 - $999,999
9	☐	☐	Under $500,000

17 Estimated gross annual revenue of your entir company/institution: (check one only):

1 ☐ Over $10 billion
2 ☐ $1 to $9 9 billion
3 ☐ $500 to $1 billion
4 ☐ $100 to $499 9 million
5 ☐ $50 to $99 9 million
6 ☐ $10 to $49 9 million
7 ☐ $5 to $9 9 million
8 ☐ Under $5 million

18 Estimated number of employees for your entire corporation:

1 ☐ Over 10.000
2 ☐ 5.000 - 9.999
3 ☐ 2.500 - 4.999
4 ☐ 1,000 - 2.499
5 ☐ 500 - 999
6 ☐ Under 500

DATA NET ARCHITECTURES

NETWORK ARCHITECTURES, DATA NETWORK EQUIPMENT, STANDARDS AND ENTERPRISE NETWORK MANAGEMENT

Worth Noting

"DME is shaping up quite differently from what people had expected."

Gail Ferreira
Management framework business manager
Digital Equipment Corp.
Maynard, Mass.
Referring to the Open Software Foundation, Inc.'s latest update on the progress of its Distributed Management Environment

Data Packets

Telepartner International last week unveiled a new version of its microcomputer-to-IBM midrange connectivity software.

Packet/400 Version 2 features a workstation inactivity timer feature that automatically disconnects users who leave their workstations unattended for a preset period of time, thereby saving connect charges. Also included is support for source routing, which lets the Packet/400 gateway bridge to an IBM Application System/400 on a separate Token-Ring local-area network.

Packet/400 is available now. It costs $17,750 for 50 workstation licenses and one gateway license.

Computer Logistics of Cleveland last week announced Windows 3.1 support for its LinkUp 3270 emulation software. The new LinkUp 3270 Unisession for Windows software supports windowed or full-screen 3270 terminal emulation in a stand-alone personal computer running control unit terminal mode with a coaxial connection to the mainframe.

The LinkUp 3270 node appears to the 3174 controller as an IBM InfoWindow 3472 terminal. The software, including the LinkUp coaxial adapter, is available for $765. Software purchased separately costs $295.

MicroTempus gives up on LAN Manager/MVS product

Offering was to turn hosts into LAN servers.

By Michael Cooney
Senior Editor

MONTREAL — Once pitched as a product that would make the mainframe a LAN server, MicroTempus, Inc.'s LAN Manager/MVS has died a quiet death.

A spokesman for the firm said the product was "shelved earlier this year," though not officially discontinued. However, sources close to the company say it has little chance of being resurrected.

LAN Manager/MVS was envisioned as a mainframe version of Microsoft Corp.'s LAN Manager running as a VTAM application on MVS systems. It was designed to turn the mainframe into a huge server supporting DOS, Microsoft Windows and OS/2 clients, and to enable administrators to manage multiple distributed local-area networks from a central site.

At its introduction in early 1990, some industry experts hailed LAN Manager/MVS as "a very important announcement and a shot in the arm for the struggling LAN Manager market effort." But the product soon lost its luster as its beta trials were pushed farther and farther back.

MicroTempus promised LAN Manager/MVS would finally beta test late last year and ship early in 1992. But the software never got out the door.

In addition to technical problems, the product suffered from the falling out between IBM and Microsoft, analysts said.

While some experts had praised the LAN Manager/MVS effort, others questioned its goals.

Frank Dzubeck, president of Communications Network Architects, Inc., a consultancy in Washington, D.C., said users have been trying to get traffic out of VTAM for years, and this product wanted them to put it back in.

"What MicroTempus wanted to do never worked effectively. It was a product without a market," Dzubeck said. "The main problem with mainframe-based products is they cost too much and do too little for users to justify."

The LAN Manager/MVS component could cost as much as

(continued on page 14)

Start-up unveils standard videoconferencing switch

By Jim Duffy
Senior Editor

LEXINGTON, Mass. — VideoServer, Inc., a videoconferencing start-up, last week unveiled a product that company officials believe will compel even the most skeptical users to implement videoconferencing networks.

The new Model 2000 multipoint control unit (MCU) ties multiple video coder/decoders to allow numerous user sites to participate in the same videoconference. The MCU supports codecs from different vendors by adhering to the CCITT H.243 standard for video and audio data frame structures, call setup and multipoint videoconferencing.

Previously, users had to implement proprietary MCUs that were specific to a particular vendor's codec if they wanted to set up an interactive, multipoint videoconference, said VideoServer President Robert Castle. This meant they had to purchase a different MCU for each codec if they deployed codecs from different vendors in their network.

With VideoServer's standards-based Model 2000, users can purchase one MCU to link multiple codecs from multiple vendors.

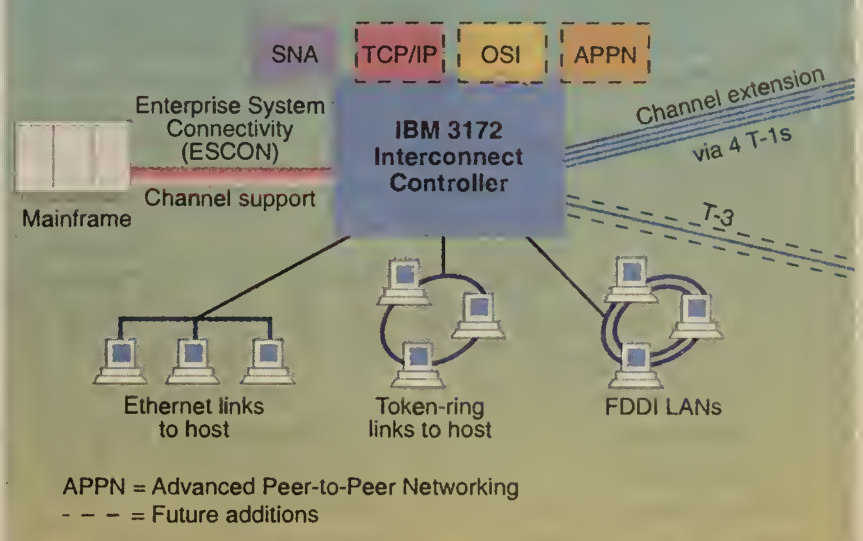
As a result, Castle believes the Model 2000 will meet with wide appeal. "This, along with standards, is what's going to allow videoconferencing to take off," he said.

The Model 2000 serves as the central hub in a videoconference network. One MCU can support as many as 28 users and 14 simultaneous conferences. Multiple MCUs can be linked over T-1 lines to support as many as 80 users.

The MCU links codecs to private branch exchanges or directly to carrier services through integrated data service unit/channel service units or optional inverse

(continued on page 14)

A box for all reasons


SNA
TCP/IP
OSI
APPN
Enterprise System Connectivity (ESCON)
Channel support
Mainframe
IBM 3172 Interconnect Controller
Channel extension via 4 T-1s
T-3
Ethernet links to host
Token-ring links to host
FDDI LANs
APPN = Advanced Peer-to-Peer Networking
- - - = Future additions

Currently positioned as a LAN-to-mainframe communications and channel extension device, IBM's 3172 Interconnect Controller will ultimately handle communications processing for multiple protocol stacks and higher speed wide-area links.

GRAPHIC BY SUSAN SLATER

IBM struggling to define role of 3172

Controller provides SNA mainframe access, is also taking on functions of Big Blue's 3745 FEP.

By Michael Cooney
Senior Editor

WASHINGTON, D.C. — IBM's 3172 Interconnect Controller is quickly making its way to the forefront of the company's multivendor LAN connectivity strategy, even while users and analysts say the box is facing an identity crisis.

On the one hand, some say the 3172 is taking on Systems Network Architecture communications functions normally handled by IBM's 3745 front-end processors (FEP), including routing and tying local-area networks to mainframes. IBM does not acknowledge this conflict, yet it declined to comment on its 3172 strategy for this story. A spokesman said the company is reevaluating the box's position.

That hasn't stopped third-party vendors from jumping on the bandwagon, however, as a number of them have rolled out or are planning their own 3172-compatible products.

Introduced in 1989, the 3172's primary mission is to provide SNA mainframe access for LANs based on Ethernet, token ring, Transmission Control Protocol/Internet Protocol and Fiber Distributed Data Interface. It also supports wide-area channel-to-channel connections over T-1 lines for linking mainframes to each other and to peripherals, such as printers and direct-access storage device.

While those are the box's main attributes, IBM has always hinted the 3172 was destined for bigger and better things.

At INTEROP 92 Spring, for example, IBM demonstrated "off-load technology," new software that will run on a 3172 to handle TCP/IP communications processing, relieving the mainframe of that task.

Analysts predict more is in store for the 3172.

"There's no reason why IBM couldn't off-load other stacks, like OSI, onto the 3172 in the future," said Frank Dzubeck, president of Communications Network Architects, Inc., a Washington, D.C.-based network consultancy. IBM could also give the 3172 routing functions, he added, making it a new flavor of FEP.

But by adding FEP-like features to the 3172, IBM could damage its cash cow 3745 business, others said.

"If the 3172 were featured properly, it could destroy any need for a 3745," said John Scoggin, net supervisor at Delmarva Power & Light Co. in Wilmington, Del. "But IBM makes a lot of money on the 3745, so the 3172 will probably be held back."

Others disagree.

Analysts at the International

(continued on page 14)

MicroTempus gives up on product

continued from page 13

$50,000, according to analysts.

IBM and Phaser Systems, Inc. have products that make the mainframe a server for Novell, Inc. NetWare LANs. IBM's LAN Resource Extension and Services software lets the mainframe act as a server of servers for attached NetWare networks, while Phaser's NetWare for MVS performs a similar function.

"The LAN Manager/MVS product was never blessed or remotely recognized by IBM, which would have gone a long way toward MicroTempus' success," said Kevin O'Neill, vice-president of research for Business Research Group in Newton, Mass.

MicroTempus does have other products. Its Enterprise Router, which also runs as a VTAM subsystem on the mainframe, was designed to route incoming LAN traffic to LAN Manager/MVS but can be used to route LAN traffic through the mainframe and onto another LAN. Its Tempus Share software lets the mainframe act as a file server for remote personal computers.

Start-up unveils standard switch

continued from page 13

multiplexers.

The Model 2000 supports T-1/E-1 and fractional T-1/E-1, as well as 56K, 64K and 384K bit/sec transmission services, plus Integrated Services Digital Network Basic and Primary Rate Interfaces and V.35 interfaces.

Users can initiate conferences by scheduling the MCU to dial out at a predetermined time, or users can dial into the system from their codec.

Currently, the Model 2000 supports only wide-area connections, but VideoServer plans to fit the system with local-area network interfaces once one technology — either Fiber Distributed Data Interface, IEEE 802.9 or Asynchronous Transfer Mode — is embraced by users and vendors for LAN-based videoconferencing, Castle said.

IEEE 802.9 defines concurrent packet and circuit transmission over the same line. Packet transmissions over traditional Ethernet and token-ring LANs are inadequate for real-time interactive videoconferencing, which requires the noninterruptible, guaranteed bandwidth that circuit switching provides, he added.

The Model 2000 is compatible with CCITT standard-compliant codecs. It ranges in price from $75,000 to $149,160 and is expected be available in the third quarter.

IBM struggling to define role of 3172

continued from page 13

Technology Group (ITG) in Los Altos, Calif., believe the 3745 will ultimately absorb many of the 3172's characteristics, in effect removing the need for a separate 3172-type device.

However you look at it, observers said, the 3172 has an identity crisis.

"IBM has not clearly enunciated the role of the 3172," said Rick Villars, an analyst with International Data Corp. (IDC) in Framingham, Mass. Because of that, the 3172 is still being sold into pure TCP/IP environments, a trend IDC predicts will soon change as IBM adds more functions to the box in order to get a chunk of the LAN-to-mainframe controller market.

But third-party vendors also want a slice of that pie and, despite the confusion over the 3172's future, they are rolling out their own versions of the device.

NCR Corp.'s Networks Products Division, formerly NCR Comten, in St. Paul, Minn., will later this year roll out its own 3172-compatible controller.

"We want to use our 3172-type device to link wide-area networks to the mainframe," said Linvel Karres, director of product development for the Network Products Division. "We're targeting the X.25, frame relay and T-3 markets with [Asynchronous Transfer Mode] and [Switched Multimegabit Data Service] support further in the future."

McDATA Corp. in Broomfield, Colo., already has a 3172-type device, the LinkMaster 6100, which Delmarva Power is using as a way to rid its net of its aging FEP.

"We're converting 85% of our SNA traffic to a 6100 and putting the rest of it through a smaller 3745," said Delmarva Power's Scoggin.

Brian Witt, group product manager for McDATA, said one of the 3172's greatest challenges will be to support its growing number of users. "The box will have to become more scalable than it is now," he said.

Communications Network Architects' Dzubeck said scalability should not be a problem because IBM will continue upgrading the box's CPU or move the entire platform to the RISC System/6000.

Companies all across the country have conquered their fear of outsourcing and learned the truth–outsourcing saves time and money. "We anticipated network growth, so flexibility was important," said Demo Tsagarakis, MIS Director for Alpha Corporation. "Cost effectiveness in outsourcing our data network included not only data transmission costs but reducing our staff time in monitoring and managing the network." Companies have also discovered that the change to outsourcing isn't as much trouble as they thought: "Making the switch from AT&T to Cylix was no more disruptive to our operations than installing a fax line," said Robert Smith, IS director for Electrical Insulation Suppliers. And smaller companies have learned

The Talk About Outsourcing.

that outsourcing isn't just for the big guys: "At first we didn't feel we were large enough to consider outsourcing. However, selectively outsourcing our data network provides for more time to concentrate on our applications," said Harold Atkins, corporate secretary of Churchill Truck Lines. When you outsource with Cylix, we manage your data network for you. We order, install, manage and maintain all communications equipment and leased lines. All for one monthly fee that can save you at least 10% on the operating costs of trying to do it yourself. Get the full scoop on outsourcing. Call us at 1-800-234-2954 and we'll send you *The Talk About Outsourcing*, a collection of case studies on outsourcing, absolutely free.

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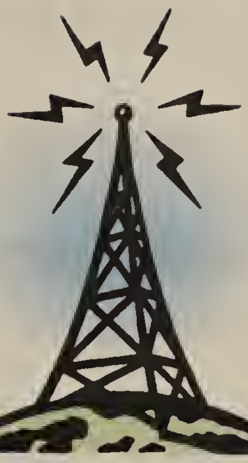

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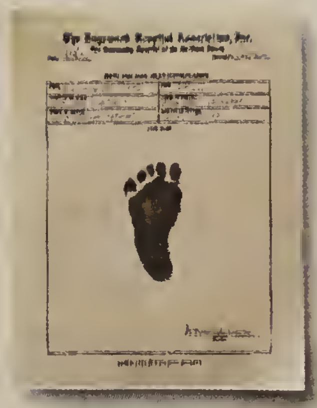

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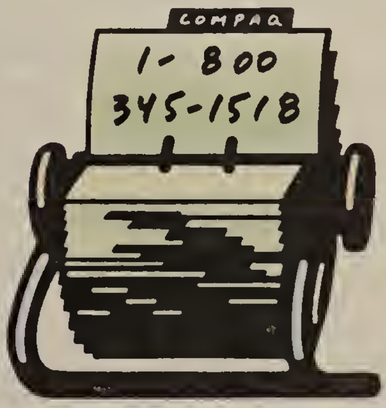

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PORTABLE 486c Model 120 ‹ PORTABLE 486c Model 210 SLT 386s/20 Model 60 ‹ SLT 386s/20 Model 120 ‹ LTE Lite/20 Model 40 ‹ LTE Lite/20 Model 60 ‹ LTE Lite/20 Model 84 ‹ LTE Lite/25 Model 60 ‹ LTE Lite/25 Model 84 ‹ LTE Lite/25 Model 120 ‹ LTE 386s/20 Model 30 ‹ LTD 386s/20 Model 60 ‹ LTE 386s/20 Model 84

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> PS director, LAN systems
> IBM
> Somers, N.Y.

Netnotes

Avanti Technology, Inc. last week announced enhancements for its NetAlarm Novell, Inc. NetWare management software, including support for Novell's Message Handling System and digital pagers.

With NetAlarm 3.10, administrators will now be able to receive alerts about surpassed thresholds, for example, via electronic mail or a pager. The new version also lets administrators set separate thresholds for messages broadcast on a NetWare local-area network and those sent via E-mail or pager. NetAlarm 3.10 is available now for $495 from Avanti, based in Austin, Texas.

Allied Telesis, Inc. last week brought out a new Ethernet concentrator that can provide management and redundancy for up to 96 local-area network-attached devices.

The new AT-3612T has 12 10Base-T ports. However, according to Allied Telesis, based in Mountain View, Calif., up to eight AT-3612Ts can be plugged into a single chassis to build a departmental concentrator with 96 ports. Each AT-3612T unit is self-sufficient, allowing the administrator to hot-swap malfunctioning units, and all can be managed via the Simple Network Management Protocol.

The AT-3612T will be available next month for $1,795.

Sitka Corp., a subsidiary of Sun Microsystems, Inc., last week announced NetPrint

(continued on page 27)

Managing Mac net resources simpler with Silver Cloud

Chooser replacement organizes large networks.

By Margie Wylie
Senior Editor

WALNUT CREEK, Calif. — A small software module released last week by The AG Group, Inc. promises to free managers and users of Apple Computer, Inc. AppleTalk networks from the large problems they face in organizing and accessing networked resources.

The $49-per-user Silver Cloud is designed to replace Apple's Chooser, a system software module through which Macintosh users view and connect to network services.

Unlike the Chooser, which offers users long unstructured lists of zones, or logical segments, and other resources on a network, Silver Cloud lets managers organize resources into hierarchical lists that limit what a user sees. Silver Cloud also offers users a consistent view of the network by using aliases to mask name and location changes, and it allows users to search for resources.

The Chooser makes AppleTalk users sort through every choice possible to find a server, printer, modem or other net resource.

"It's a pain in the rear," said Mike Bailey, systems integrator for Lockheed Missiles and Space Company, Inc. of Sunnyvale, Calif. With over one hundred zones, "it takes several minutes to scroll through them all. It's just a mess trying to find something on the network."

With Silver Cloud, managers can organize network zones and services into logical groups, for example, by department. Unnecessary or sensitive services can be hidden from users when the hierarchy is set up.

"I have subcontractors and customers coexisting with us on the network that right now have access to everything on the net," said Jerry Griffin, technical specialist for systems integration in McDonnell Douglas Corp.'s Huntington Beach, Calif., Space Station Division and a Silver Cloud beta user. "[Silver Cloud] lets me

(continued on page 27)

Racore NIC brings fiber to desktop

By Caryn Gillooly
Senior Editor

LOS GATOS, Calif. — Racore Computer Products, Inc. has brought out a fiber-optic token-ring network interface card designed for IBM's PS/2 Micro Channel Architecture (MCA)-based machines.

The new adapter, called the FiberCard M8118, provides a direct fiber connection to the desktop for $995, a price the company claims rivals that of similar copper-based offerings.

Planning for future

In addition, the M8118 can support both fiber and shielded twisted-pair cabling for customers that have copper installed but plan to move to fiber.

"Our switchable adapter card delivers the future on today's budget," said John LaPorta, president of Racore, based here.

The M8118 is a compact 32-bit MCA adapter that comes standard with 512K bytes of random-access memory. According to the company, it supports both 4M and 16M bit/sec transmission for customers that plan but have not yet moved to higher speed networking.

To help take advantage of the card's options, all adapter parameters — including speed and connection type — are controlled through software that ships with the card. Competing cards often require the administrator to physically adjust dip switches on the card.

The M8118 supports Novell, Inc.'s Open Driver Interface-based drivers as well as those conforming to Microsoft Corp.'s Network Driver Interface Specification. It supports most major network operating systems and transport protocols.

The FiberCard M8118 is available now. Racore's FiberCard product line also includes the 16-bit M8117 for Industry Standard Architecture-based IBM Personal Computer AT and XT and compatible models. ◻

> "When Banyan gets the opportunity to tell its story to a major account, Banyan wins. But there are a lot of people who don't hear the story in time and buy some other product. One of the things we need to figure out is how to get Banyan routinely on the customer's short list."

▲ ▲ ▲

Peter Hamilton
President and chief operating officer
Banyan Systems, Inc.

New Banyan chief ready for challenges

Former HP executive Peter Hamilton shares his thoughts on Novell, VINES and openness.

Banyan Systems, Inc. recently named Hewlett-Packard Co. executive Peter Hamilton as its president and chief operating officer to lead the company into its next growth phase. The Westborough, Mass. local-area network vendor, which is expected to go public soon, has been looking for a strong operations person for several months.

Hamilton brings strong credentials to Banyan. He most recently served as general manager of three HP organizations: the Colorado Networks Division, the Systems Management Division and the OpenView Network and Systems Management Program.

He will take over day-to-day operations at Banyan in early July. The move will enable David Mahoney, Banyan's current president and a cofounder of the company, to focus on strategic planning as he continues in his other roles as chairman and chief executive officer.

Network World Senior Editor Bob Brown recently asked Hamilton about his plans for helping Banyan's growth.

Why are you leaving HP?

It's been the most difficult decision in my career. But there is a challenge in coming into Banyan at the level of president — a position that was unreasonable for me to expect to attain anytime soon in a $16 billion company [such as HP].

While they are different sized companies, I think Banyan has an exciting growth opportunity and good track record, and is developing a strong position in the enterprise and global networking market segments.

Have HP and Banyan worked together?

A little bit, but not extensively. We've both submitted technologies to the Open Software Foundation [Inc.] for the [Distributed Management Environment], so we've worked in that context.

We have some mutual customers that are interested in Banyan VINES on HP [Reduced Instruction Set Computing] systems. It is likely that at some point in the future, you might find VINES running on an HP RISC computer.

Banyan has been criticized for being proprietary, although it has made efforts to become more open by porting VINES to various Unix platforms. How important will openness be to Banyan?

You can probably imagine where I stand on open-end systems and networks. I will certainly come with that preference. In some ways, you could say Banyan has a bit of a bad rap. VINES is based on Unix and TCP/IP, but I understand what you're saying. VINES clearly hasn't been as open and freely licensed to multiple platforms as it could be.

Those are questions that will have to be addressed, and I can't tell you how we'll move yet. But I certainly have a strong belief that there is a lot of opportunity for competitive differentiation in an

(continued on page 26)

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New Banyan chief ready for challenges

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open systems environment.

Other LAN vendors, including IBM and Novell, Inc., have recently outlined network management architectures. Does Banyan have a stated management architecture?

Nothing has been publicly disclosed, but from what I've looked at, I feel comfortable that there is a well-thought-through technology plan and architecture to deliver the future products from Banyan. I think one of the areas I'd like to put some energy into when I get on board is the strategic planning and positioning of Banyan's products today and intent for the future.

If we could strengthen the strategic product marketing position, it would help Banyan's growth. When Banyan gets the opportunity to tell its story to a major account, Banyan wins. But there are a lot of people who don't hear the story in time and buy some other product. One of the things we need to figure out is how to get Banyan routinely on the customer's short list.

What other goals do you have?

Banyan clearly is not a turnaround situation. The company is headed in the right direction in a hot marketplace, and we need to keep the momentum. Banyan had good order performance in the first part of the year and strong profit growth. So it's not as if we need to make any sweeping changes.

One thing we need to do is look at the channels [of distribution], which may be limiting Banyan's growth. We may be able to enhance their effectiveness.

Is Banyan's strategy to coexist or compete with Novell, and do you think that strategy is clear?

I think Banyan has a clear strategy internally, but I don't think it is fully communicated within the marketplace. There are some significant product differences between [Novell] NetWare and [Microsoft Corp.] LAN Manager and [Banyan] VINES, and to the average person, those distinctions and the value of those distinctions may not be clear. For example, Banyan is strong in systems administration.

VINES also needs to coexist with NetWare. There is no way you can take the 60% or whatever share of the market Novell has and not coexist with it.

How will Banyan counteract the threat of Novell beefing up its directory services in the next version of NetWare, given directory services has always been a competitive edge for Banyan?

In conversations I've had with the technical people at Banyan, there are still some significant differences between what are the stated capabilities of that product and what they deliver. It isn't shipping yet, at least in volume. I understand taking this kind of functionality and rolling it into NetWare is a major enhancement. It will take time for it to become mature and get to the point where customers have enough confidence in it to put critical applications onto it. I think there is a lot of time left for Banyan to extend its lead in global naming and directory services.

How much of a challenge does Microsoft pose with its new NT operating system?

I've heard Bill Gates talk about NT, and his own ambitious goal is for NT to be about 15% of the server environment. So even by his own statements, he's not imagining this taking over the world. Also, everything that Microsoft has done has not turned out to be successful — LAN Manager certainly is a disappointment to everyone, including Microsoft, and it took three releases of [the company's] Windows to get it right. Banyan's committed to providing NT client support into VINES. We have to be heads up on NT, but I don't know yet whether it is a server of a significant competitive nature.

We're seeing the emergence of large interconnected LAN networks, just the market Banyan has always targeted. So why isn't VINES catching on in a bigger way?

Banyan is in exactly the right position at the right time. Users are beginning to understand that having these islands of automation — departmental work groups where PCs are tied into servers — are not delivering the value benefits to end users [because they do not] provide them the information access they need in a global environment. I think they are now beginning to understand there is an alternative available that can greatly enhance their ability to do just that. I think you are going to see a tremendous growth in VINES acceptance. ◼

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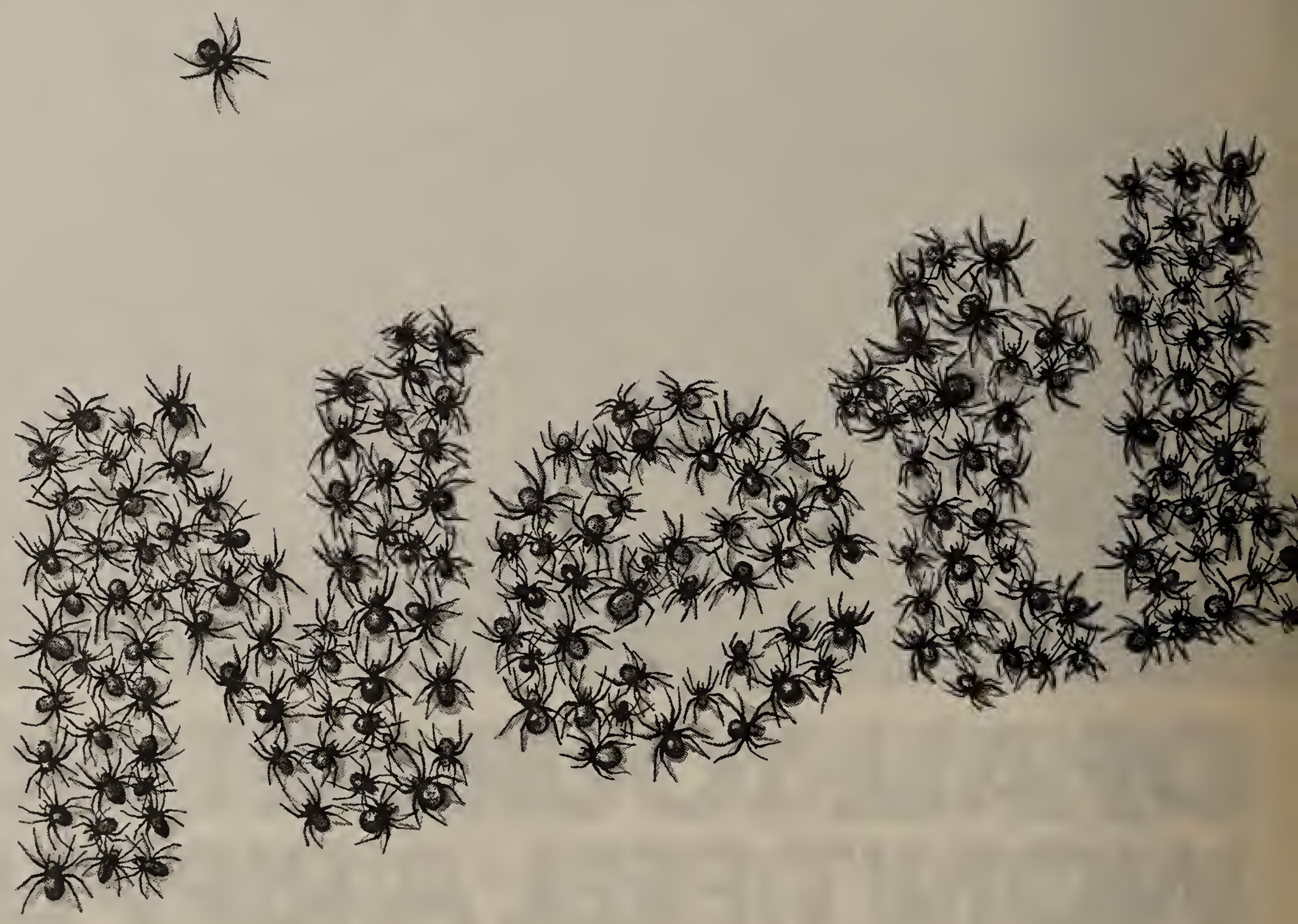

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And you may also know TTC because of our digital transmission test and analysis products. Over the past ten years, we've specialized exclusively in network test and analysis, and our FIREBERD and T-BERD products have helped to establish a standard in the industry for quality and flexibility.

With today's complex internetwork environments, there is also

Netnotes

continued from page 23

Sun, a software package that lets Sun workstation, Apple Computer, Inc. Macintosh and IBM-compatible personal computer users share printers.

The software sits on a Sun workstation, basically turning it into a network print server. It lets Macintosh and PC users on any Ethernet or LocalTalk net attached to the server access Sun printing services and lets Sun users print to any Macintosh or PC PostScript printer on the network.

NetPrint Sun is available now for $495 through Sitka resellers.

Novell, Inc.'s NetWare, Microsoft Corp.'s LAN Manager and IBM's LAN Server net managers can get special help from a packet analyzer designed just for them.

The $995 LANProbe, from Redmond, Wash.-based **General Software, Inc.,** not only captures and decodes general Ethernet traffic, but also intercepts IBM Network Basic I/O System and Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) packets, as well as specialized network Login packets to help managers detect intruders. The package comes with software and a special Ethernet card that lets managers troubleshoot the LAN from any network node.

Claiming to have set a new local-area network speed record, **SysKonnect, Inc.** has announced four new Extended Industry Standard Architecture-bus Fiber Distributed Data Interface net interface cards.

Running on a Novell, Inc. NetWare network using Novell's throughput tests, the company claimed its cards exceeded 8.5M byte/sec when used with NetWare servers and 2.5M byte/sec transfer speeds with clients. That's 68M and 20M bit/sec, compared to FDDI's theoretical upper limit of 100M bit/sec.

SysKonnect will offer single- and dual-port versions of the card as well as different versions for shielded and unshielded twisted-pair wire, all of which will ship this month. Each will come with drivers for SysKonnect's SK-Passport, which is software that lets users attach to multiple file servers through a single net interface card.

Users, however, might have trouble sizing up the card since the company will not publish list prices and sells exclusively through value-added resellers and systems integrators.

Network Computing, Inc. (NCI) has added three new features to the LANAlert Network Management System, the Dallas-based company's flagship product for managing Novell, Inc. NetWare 2.X and 3.X local-area networks.

For remote management capabilities, NCI introduced the LANPage Gateway and LANAlarm Console. The LANAlarm Console is software residing on a remote workstation that receives network alert messages from LANPage Gateway, a server-resident application. LANPage Gateway can also be configured to send alert messages to a prespecified pager instead of the LANAlarm Console.

NCI also released LANExam, software for its LANAlert system that supports inventory, configuration and performance monitoring of all NetWare nodes.

All three features will be available next month. LANAlarm will cost $495, LANPage will cost $295, and LANExam will cost $595 per 100 nodes. ◻

Managing Mac net resources simpler

continued from page 23

segregate my customers from the rest of the network."

Once set up, Silver Cloud's hierarchy of services is stored in a separate configuration file that can be easily replaced to keep network users up to date.

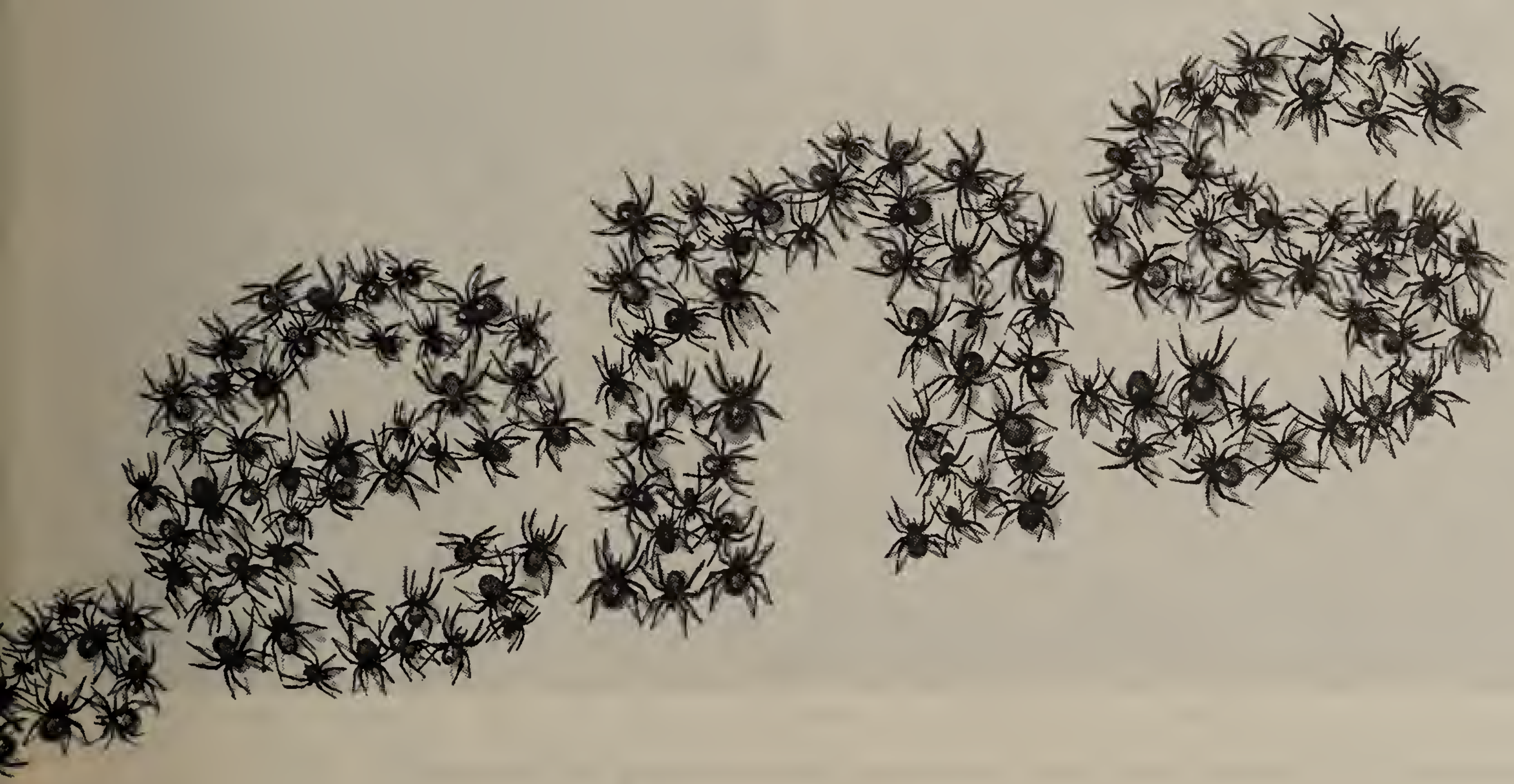
However, since configuration files can be generated by any Silver Cloud user, the software can only guide users in navigating the net. It does not secure services from snoopers or impose a uniform view of network services.

"It's a very good tool, but until you can lock it down, there is a fairly large hole in your overall security," Griffin said.

Aliases allow administrators to hide changing device names and locations, thereby simplifying using the net. For example, after an AppleShare server is moved from one zone to another, users could continue to access it through the same alias, regardless of its physical location. With the Chooser, users must know the zone in which a server or any other resource resides in order to access it.

Unlike the Chooser, Silver Cloud also lets users display and choose from more than one type of network service — for instance, zones, printers and modems — simultaneously.

Silver Cloud will be available in single-user and multiuser packs. ◻



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INTERNETWORKS

LAN-TO-LAN AND LAN-TO-WAN EQUIPMENT AND STRATEGIES

Worth Noting

> "For users who aren't rocket scientists, a key advantage of local bridges is that they are plug-and-play devices."
>
> **Rich Seifert**
> President
> Networks and Communications Consulting
> Cupertino, Calif.

Link Notes

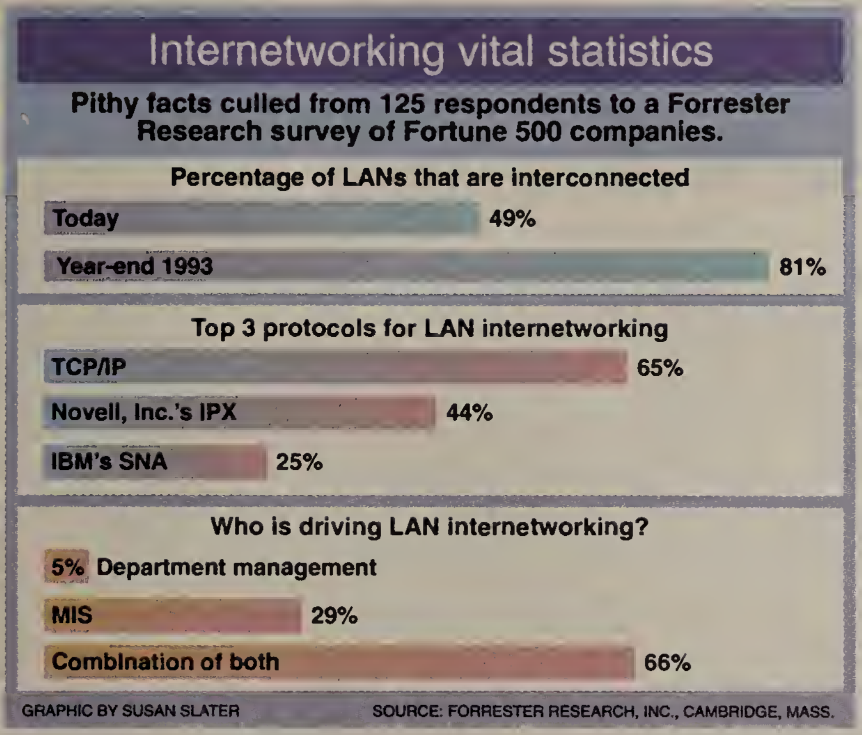
Netronix, Inc. today will unveil the newest version of its TokenMaster 2000 16M bit/sec local token-ring bridge that can achieve near wire-speed throughput.

New modifications, collectively dubbed the Token Ring Interface Accelerator, improve the performance of the IBM Token-Ring Network minimodule residing inside the bridge, enabling it to achieve 15.4M bit/sec speed.

The TokenMaster 2000 with the Token Ring Interface Accelerator costs $4,690 and is available now.

Fibronics International, Inc. last week announced a 50% reduction in the price of its Ethernet- and token ring-to-Fiber Distributed Data Interface bridges and Ethernet-to-FDDI bridge/routers.

Prices for the bridges have been cut to $12,000 for single Ethernet-to-FDDI bridges, $16,000 for dual Ethernet-to-FDDI bridges, $15,000 for single token ring-to-FDDI bridges, $19,000 for dual token ring-to-FDDI bridges, and $19,000 for both Ethernet- and token ring-to-FDDI Translation bridges. Single-port Ethernet-to-FDDI bridge/routers and dual-port Ethernet-to-FDDI bridge/routers have been reduced to $15,000 and $19,000, respectively.



GRAPHIC BY SUSAN SLATER SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.

UB fills out low end of hub line with 12-port model

ASE1000 Access/Hub is aimed at work groups.

By Skip MacAskill
Staff Writer

SANTA CLARA, Calif. — Ungermann-Bass, Inc. has unveiled a low-end hub that can connect as many as 12 devices using shielded or unshielded twisted-pair wiring.

The new ASE1000 Access/Hub, which fills out the low end of the company's hub line, is geared to Ethernet-only department or work group environments that do not require all the functionality of UB's Access/One enterprise hubs.

The product, a 12-port 10-Base-T hub, comes equipped with an attachment unit interface (AUI) port for local-area network backbone connection. It can link any combination of 12 personal computers, IBM Personal System/2s, Apple Computer, Inc. Macintoshes or Unix workstations via shielded or unshielded twisted pair.

The Access/Hub also features a cascade capability that allows users to extend their network by using transceivers and linking the device to other Access/Hubs or Access/Ones.

Cascading can be accomplished in two ways. By utilizing the AUI connector, users can attach an Ethernet or fiber-optic transceiver to an Access/One, which in turn supports as many as 144 devices.

Users can also daisy-chain as many as 12 Access/Hubs to one another, which would enable a single LAN connection to support up to 132 Ethernet devices. Employing both cascading methods can boost that figure to 276, according to UB.

The hub comes in unmanaged or Simple Network Management Protocol-based versions. The unmanaged model can be upgraded in the field, with a new daughterboard and software, to the SNMP version.

In addition to the 10Base-T standard, the managed version is compatible with the IEEE 802.3K Repeater draft standard, which defines a Management Information Base (MIB) specific to hub management. Additionally, it supports SNMP MIB I and II as well as UB's own MIB extensions.

The hub can be managed by NetDirector, which is UB's network management system, or any third-party SNMP-based management system, such as SunConnect's SunNet Manager or Hewlett-Packard Co.'s OpenView.

After initial configuration, management information is stored in erasable programmable read-only memory, which maintains the data in the event of a power outage.

The managed Access/Hub version is priced at $1,995, while the unmanaged model costs $1,395. Both are available now and come in rack-mountable or stand-alone versions. The SNMP upgrade kit is priced at $750 and is also available now.

Hub helps printer get its image across

Artel's Galactica hub helps Anderson Lithograph ship large image files across its Ethernet LANs.

By Maureen Molloy
Senior Writer

LOS ANGELES — Transmitting 100M to 300M bytes of data across an Ethernet local-area network is usually not very practical.

But through the use of a new bridging hub, it's an everyday occurrence at Anderson Lithograph, a large commercial printing company here.

The firm is using Artel Communications Corp.'s 6-month-old Galactica bridging hub to manage the flow of multimegabyte image files between the high-end Unix workstations and Apple Computer, Inc. Macintoshes used to support printing applications on its Ethernet LAN.

Several years ago, in response to requests from advertising agencies and design studios, Anderson began developing a digital color press capability using Macintosh equipment.

"We found that our clients increasingly wanted to use Macintosh-based desktop publishing software in place of manual methods to create page plans and layouts," said Randall Wright, the company's systems manager. "This computerized approach enables them to design better blueprints faster and at less cost."

Initially, Wright installed a single stand-alone Macintosh. But with continuing growth in workstations, printing and other equipment, the company saw a need to develop a net that would not only connect the Macintoshes, but also link them to DuPont Crosfield electronic stripping devices.

The network had to be Ethernet-based in order to accommodate the Macintosh equipment. But the bandwidth constraints of a conventional Ethernet LAN were insufficient for transmitting images ranging from 100M to 300M bytes in size.

"A daisy-chained Ethernet is excruciatingly slow for our applications, and we were getting abhorrent throughput," Wright said. To solve the problem, the company installed the Galactica multiport bridging hub.

The hub has a 1G bit/sec backplane and can support up to four Ethernet or two Fiber Distributed Data Interface network interface cards. The Ethernet modules are equipped with eight ports, each of which supports an independent Ethernet segment.

Bridge filtering and forwarding decisions are made at each port on the card, so local traffic remains local and many packets can be forwarded directly to a receiving port on the same module. Only interboard traffic traverses the hub backplane. Thus, each board can handle a full 10M bit/sec of traffic on every port simultaneously — or 80M bit/sec of aggregate throughput per card.

Performance up 500%

As a result, Wright said, image file-transfer performance has increased more than 500%, enabling the company to significantly speed delivery of printing jobs to clients.

"In the graphic arts industry, image transfer is the bulk of our business. The faster we can transport an image from one station to the other, the faster we can get it back to the client," he said.

Anderson is using the hub to support a Macintosh network. Two ports are used to support 10Base-T hubs, each of which serve five or six devices, such as Macintosh dash 30fx, IIfx, IIci and SE/30 workstations, as well as Apple Laserwriters and other printers.

A third port hooks to a Novell, Inc. server, Agfa SelectSet 7000 imagesetter and a net management station. Three other ports tie in Sun Microsystems, Inc. SPARCstation 2s, which are used to perform conversions between Macintosh and DuPont Crosfield protocols. The remaining two ports provide bridging to more than 10 DuPont Crosfield devices.

Wright said he also chose the Artel hub because it will enable him to replace the current Ethernet cable with fiber-optic lines in the future. Fiber's speed will enable the company to further streamline its operations by eliminating the use of film and, instead, outputting digitized pages directly to printing plates.

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Worth Noting

The U.S. telecommunications industry posted a positive trade balance of $78 million in 1991, compared to a deficit of $362 million in 1990, according to the Telecommunications Industry Association, a trade organization for telecom equipment and services firms.

Regulatory Update

AT&T last week entered the homestretch in its efforts to save its Tariff 15 deals from extinction. AT&T filed documents with the **Federal Communications Commission** rebutting legal questions raised by competitors and the agency itself about the specialty discount deals. Tariff 15 allows AT&T to offer a specific customer prices below its tariffed rates if a rival first makes a similar offer to that customer. The Communications Act of 1934 requires AT&T to offer the same terms to all customers, but the carrier has argued that in order to compete, it must be able to match rivals' off-tariff offerings.

Once the FCC reviews AT&T's filing, it will be able to make a final decision about the legality of Tariff 15. The FCC has already rejected Tariff 15 once as illegal, but AT&T took the agency to court and forced the FCC to reopen the matter. At issue is AT&T's first existing Tariff 15 deal for Resorts Condominium International, Inc. Although the legal argument at hand focuses only on that deal, it is virtually certain that if it is found illegal, all other Tariff 15 deals would be thrown out, as well. ◻

"I'd expect the average price of our cellular calls to be cut in half."

▲▲▲

Sam Shiels
Director of telecommunications services
SmithKline Beecham Corp.

SmithKline trials cellular links to virtual network

Lets domestic callers use 7-digit dialing plan.

By Bob Brown
Senior Editor

PHILADELPHIA — Cellular communications is proving to be the right medicine for SmithKline Beecham Corp., a big pharmaceutical maker here that is looking to make its work force more productive and cut telecommunications costs.

SmithKline is winding up a two-month technology trial with Bell Atlantic Mobile Systems and Sprint Corp. in which SmithKline has enabled its cellular phone users to make and receive calls over the company's global virtual network using a standard seven-digit dialing plan.

In the past, users have only been able to access the virtual net via switched or dedicated terrestrial links or via a clumsy cellular setup that involved going through the local exchange carrier network and dialing more digits.

Seven-digit cellular access to the company's 60-site global virtual net is designed to provide more cost-effective and convenient communications between the firm's U.S. and U.K. employees, said Sam Shiels, director of telecommunications services at SmithKline.

The firm was formed in 1989 via the merger of Philadelphia's SmithKline Beckman Corp. and the U.K.'s Group Beecham.

Communications is more cost-effective because users can place cellular calls over the private virtual net instead of using direct distance dialing (DDD) facilities, according to Glenn Kruse, manager of wireless markets for Sprint in Atlanta. It could also increase traffic volumes enough to push the company into a higher discount bracket.

Under the trial, SmithKline's on-net seven-digit Sprint dialing plan is extended to mobile workers through cellular links, bypassing the local wire-based network, Kruse said. Previously, users had to dial 10 digits and the cellular carrier had to hand off the call to a local carrier before it would hit the virtual net, creating a longer setup time.

SmithKline still pays for airtime as it would on any cellular call, but the long-distance charge is replaced with a virtual net charge, according to Shiels.

"It's hard to estimate how much cellular access to [the virtual network] will save us because having the option will greatly change our calling patterns," Shiels said. "I'd expect the average price of our cellular calls to be cut in half though."

Users can place cellular calls over the private virtual net instead of using DDD facilities.

▲▲▲

The cellular access to the virtual net makes calling the U.K. more convenient for domestic SmithKline employees during their morning commute, buying employees more time to work with colleagues in that time zone, Shiels said. And the company will no longer need to worry about

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Miami school plans ahead with SONET

Use of SONET on private campus will provide ability to handle future high-bandwidth needs.

By Bob Wallace
Senior Editor

MIAMI — The University of Miami last week claimed it has become the first U.S. college to implement a Synchronous Optical Network (SONET) link in a private campus network.

The private 155M bit/sec SONET connection, which links the university's cancer research center with a medical sciences facility here, currently carries voice traffic but will soon support a medical imaging application.

The university decided to install the SONET link to its new cancer research center last year because SONET transmission equipment was available and offered enough bandwidth to support today's high-capacity applications as well as tomorrow's.

"We needed to create an infrastructure that could support our networking needs today and handle future high-bandwidth applications when needed," explained Ted Lipsky, telecommunications project director for the school. "We couldn't find anything better than SONET."

The SONET link is supported by an AT&T Network Systems DDM-2000 Optical Carrier (OC)-3 optical multiplexer in the Rosentiel Medical Science Buildings and a second in the Sylvester Comprehensive Cancer Center. Voice traffic comes from AT&T Definity Generic 2 private branch exchanges in each building.

The university originally anticipated using four T-1s on the 155M bit/sec SONET link to carry voice traffic but has revised its projection and now uses eight T-1s to handle the calling volume.

The Definity Generic 2 at the Sylvester facility serves as a tandem switch for the university's electronic tandem network. The

(continued on page 32)

Microwave users bent on keeping their spectrum

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Making good on their vows to fight the FCC every step of the way, microwave users from utilities and railroads have sharpened their attacks on FCC efforts to use their frequencies for new emerging technologies.

In February, the Federal Communications Commission formally notified microwave users that they would have to share their spectrum on an equal basis with new wireless technologies, such as personal communications services (PCS), or move elsewhere. Microwave users, which have been moved once before to make way for new technology — digital broadcast satellite — were infuriated and vowed to wage a bitter campaign on Capitol Hill to stop the FCC.

Their efforts paid off recently when several users got the chance to air their concerns publicly before the Senate Committee on Commerce, Science and Transportation. The users told lawmakers that forcing them to move could jeopardize their operations and would be prohibitively costly.

Sen. Ernest Hollings (D-S.C.), chairman of that committee, has said that if the FCC does not move to address such concerns, he will introduce legislation forcing the FCC to guarantee that current microwave networks be protected.

The FCC is trying to move microwave users from the 1.8-GHz to 2.2-GHz frequencies they now occupy partly because PCS internationally are being allocated in that band. In order for PCS equipment to work from one country to another, a common frequency assignment is necessary, according to many experts.

At the hearing, FCC Chairman Alfred Sikes reiterated that he is aware of microwave users' con-

(continued on page 33)

Southwestern Bell offers ISDN PRI service in Kansas

By Bob Wallace
Senior Editor

KANSAS CITY, Kan. — Southwestern Bell Telephone Co. last week began offering ISDN Primary Rate Interface (PRI) service with features that help users optimize bandwidth utilization.

The service, dubbed SmartTrunk, comes with three optional features: a call-by-call service selection feature called Dynamic Channel Allocation, the Backup D Channel feature and the Network Ring Again feature.

Dynamic Channel Allocation lets users make more efficient use of PRI trunks by using any channel to access any network service on a call-by-call basis.

SmartTrunk's Backup D Channel feature gives users better bandwidth utilization from their PRIs. With the feature, a single 64K bit/sec channel can be used to handle signaling for as many as 20 PRIs. Typically, one 64K bit/sec signaling channel is required for each PRI.

The feature, expected to be attractive to users with large call centers and telecommunications service bureaus, is supported on Southwestern Bell's Northern Telecom, Inc. DMS-100 central office switch but not on the AT&T Network Systems' 5ESS switch it also uses to offer the PRI service.

The Network Ring Again feature automatically completes calls to a busy number once the called party finishes the first call.

Southwestern Bell chose not to offer automatic number identification — which is available with most PRI services. "We are seriously concerned with privacy issues surrounding ANI," said Mike Reddout, an area manager of business product management with Southwestern Bell. "We want to know how customers and regulators view these issues before we roll out ANI." The company did not rule out the possibility of offering ANI at a later date.

Southwestern Bell is also taking a different tack than most local telephone companies by offering Integrated Services Digital Network under a general tariff rather than selling it under customer-specific contracts.

But Southwestern Bell is following in the footsteps of several local telephone companies by deciding to base future deployment of the service on user demand.

"We're following a sell-and-deploy strategy," Reddout said. "If a customer wants PRI, we'll equip their central office to support it."

Reddout said several large firms plan to use the service, but he declined to identify them.

SmartTrunk's pricing stucture is complex. The price of the service depends on whether the customer signs a 36- or 60-month contract — the only two ways the service is offered — and includes monthly usage charges.

Dynamic Channel Allocation costs $375 a month and carries a $100 onetime setup charge per PRI. Network Ring Again costs $25 a month and carries a $100 onetime setup charge per PRI. D Channel Backup costs $250 a month for the first five PRIs with a $200 onetime charge and $200 a month for each additional five PRIs with a $50 onetime charge.

Southwestern Bell has filed for SmartTrunk service in Texas and Missouri. It plans to propose filings in Arkansas and Oklahoma in the next few months. Z

Miami school plans ahead

continued from page 31

PBX switches voice traffic for the school's array of hospitals and clinics as well as recently acquired buildings, Lipsky said.

The University of Miami plans to use a 45M bit/sec chunk of bandwidth on the SONET link to support an imaging application that would enable staff at both the Rosentiel and Sylvester centers to exchange X rays and magnetic resonance images (MRI), Lipsky said.

"We knew this application was coming, and we knew the existing data network would not support it," Lipsky said. "So we had to go with a design that would."

The university operates a campuswide data network that supports a variety of applications, including local-area network interconnection, but has limited bandwidth available.

"All I have to do is put a DS3 circuit pack in each DDM," Lipsky said. "And then I run coaxial cable out to the imaging equipment."

In the longer term, the university hopes to use the SONET link to support point-to-point videoconferences, which will consume about 1.544M bit/sec of capacity. "We'd love to use broadcast-quality videoconferences," Lipsky said.

The university plans to expand the SONET network to serve two or three additional sites in the next 18 months, Lipsky said.

> "Even after you figure in projected growth, there's a huge amount of bandwidth."
>
> ▲▲▲

"Even after you figure in projected growth, there's still a huge amount of bandwidth, enough to hold us for another two years or so," Lipsky said.

The university spent $70,000 on the SONET project and considered spending $40,000 more for a 622M bit/sec OC-12 SONET link.

"The [$40,000] is not a lot of money when you consider that you're quadrupling your bandwidth," Lipsky said. "But we seriously thought OC-12 would

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be overkill."

Should the school change its mind in a few years, the upgrade would be simple. The bulk of the effort would require swapping the DDM software and replacing the optical line interface units (OLIU) in the DDM-2000, Lipsky said.

The university found the DDM-2000's protection switching capability vital since the SONET link supports mission-critical information exchange between medical centers.

"With SONET, the equipment senses a failure on one [fiber] or OLIU and switches all traffic onto a second path in a matter of milliseconds," Lipsky said. "We needed this capability because we have to ensure service reliability is as close to 100% as possible." The school will soon install a second fiber route.

The protection switching feature was pressed into duty not long after the system was brought on-line. An OLIU in one of the DDM-2000s failed on several occasions, and traffic was switched onto the second path, Lipsky said. The university's staff diagnosed the problem, and AT&T provided a replacement unit. No problems have been reported during the past few months.

Users want to keep spectrum

continued from page 31

cerns but must balance that against the benefits of new technology.

"I certainly understand how important effective communications links are to enterprises — including electric utilities, railroads [and oil companies] — licensed to operate microwave nets in parts of the proposed emerging technologies' band," Sikes said.

However, he pointed out the potential benefits of technologies such as wireless local-area networks and PCS phones.

In addition, emerging technologies hold the promise of new jobs and investments, Sikes said. If wireless technologies create the same level of market demand as cellular has, the new services would generate more than 100,000 new jobs and $30 billion in investment, he added.

Microwave users, however, said the FCC should be more concerned about protecting the vital operations of utilities and railroads. Microwave nets are used to detect and clear fault conditions on high-voltage lines, relay important telemetry data between generating stations and coordinate operations among utilities, according to Robert Rainear, executive vice-president of engineering and operations for the South Carolina Public Service.

Rainear and other microwave users told Congress that microwave networks are often the only reliable communications system during disasters and that the public cannot afford to have those systems jeopardized by allowing new users onto the spectrum.

Stepping stones in FCC microwave decision

June 1990	Issues Notice of Inquiry, soliciting industry comment on how it should proceed with new wireless services.
October 1991	Issues policy statement singling out the 1.8-GHz to 2.2-GHz microwave band as appropriate slot for new wireless services.
December 1991	Holds day-long hearing at which 20 industry experts, including microwave users that will be displaced, air their views on issue.
February 1992	Issues a Notice of Proposed Rulemaking, which suggests that new wireless services will be permitted to share frequency with microwave users on equal basis at end of 10-year transition period.

GRAPHIC BY SUSAN SLATER

They also said FCC suggestions that microwave users can move to higher frequencies are not workable because those frequencies are technically incompatible with existing transmission equipment and less reliable.

Bob Bergland, executive vice-president of the National Rural Electric Cooperative Association, said new technology concerns do not outweigh the benefits of reliable electric service. "It is virtually impossible for the economy of our nation to function without electricity," he told lawmakers.

Bergland added that moving to a new frequency would increase costs and decrease reliability. In the 6-GHz range, one suggested alternative for microwave users, the tendency for signal fade is higher and microwave nets would require more stations because they must be closer together, he said.

SmithKline trials cellular links

continued from page 31

the high price of international DDD calls, he added.

Other long-haul carriers also offer cellular access to their virtual nets. AT&T's switched offering requires use of 10-digit numbers, but it is working to cut that to seven digits later this year. MCI Communications Corp. requires callers to dial 10 digits.

Sprint will make the cellular access offering available in the Bell Atlantic Mobile Systems service area beginning Aug. 1 and plans to extend the service to US West, Inc. cellular markets later this year.

SmithKline has been testing the service with about 10 employees during the pilot program and expects to expand the offering to between 700 and 1,000 workers, including executives and employees in the field.

Louis Valente, vice-president and director of strategic information technology at SmithKline, was among those users testing the service. "Cellular access to the VPN could really change the way we do business for the better," Valente said. "It provides for a virtual office."

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Worth Noting

"The move to client/server is a major paradigm shift. You can't just warm over host applications and expect to make them fly."

Tim Nagres
Senior director for
corporate strategy
Oracle Corp.
Redwood Shores, Calif.

Store & Forward

While the industry awaits this week's unveiling of Version 7 of **Oracle Corp.**'s relational database server, **Unisys Corp.** has released Version 6 of the database for its line of CTOS-based workstations and servers.

The new release is expected to provide a 20% to 70% performance improvement over Oracle Version 5.1 as well as enhancements in transaction processing and report writing.

Oracle 6.0 for CTOS is available now. It is priced at $3,900 for one to eight users, $6,400 for nine to 16 users and $11,000 for 17 or more users.

Sybase, Inc. has announced a set of support programs that include new customer service offerings and expanded consulting services.

Included are the Alliance Premium Support program, under which a technical support person is dedicated to a customer, and the Sybase Insight On-line Information Center, an electronic bulletin board serving as a technical forum for discussion.

Also, with the consolidation of its operations with its subsidiary, SQL Solutions, Sybase now offers expanded consulting services worldwide under a new program called Sybase SQL Solutions.

Horizon releases enhanced text retrieval software pack

New product offers improved search features.

By Timothy O'Brien
West Coast Bureau Chief

SAN DIEGO — Horizons Technology, Inc. recently announced an updated version of its text retrieval software that includes enhanced search capabilities and increased compatibility with leading applications.

Running on either a personal computer or a local-area network, Power!Search 1.1 enables users to search large databases, applications or even entire disks for lost files by simply building queries based on closely matching key words or phrases.

"On a LAN, this search feature is now especially helpful because you can set your search strategy by file, by directory or for the entire disk of the network file server," explained Phil Morettini, marketing manager at Horizons.

The enhanced search capability now allows users to either search the entire disk with the results displayed at the end or to interactively search file by file.

In addition, date thresholds can be set to narrow file searches. Searches can be conducted on words that are near one another but not adjacent, making it possible, for example, to search for two words that fall within three words of each other.

In this way, users can dial in the degree of exactness they want in a match when looking for lost files. Misspelled names, words that have been altered from optical character recognition scanning or words that a user is simply unsure about, can still be used to find lost files or documents.

For example, an attorney might be seeking a file that was entered six months ago from a client whose name he can't remember how to spell. By entering the name as closely as he can recall and then setting the degree of exactness required for the search, the attorney can call up all the files that closely resemble the client's name.

Power!Search 1.1 has special modules that provide compatibil-

(continued on page 36)

Imaging tool sports new feature pack

By Margie Wylie
Senior Editor

EMERYVILLE, Calif. — ViewStar Corp. has extended its LAN-based imaging and work flow system to embrace standards on both the client and server side of the computing spectrum.

Consisting of DOS-based software, a file server, work flow automation software and a fourth-generation development environment, the ViewStar system lets developers create applications that let workers move, manipulate and act on images instead of shuffling paper through the organization. The client/server program doesn't offer its own database, but can access third-party databases to store information from documents.

The new version, ViewStar 3.0, for the first time will let Microsoft Corp. Windows and DOS clients access a ViewStar image server. Windows 3.1 users can run the ViewStar client application and access the imaging server, database and remote access services simultaneously. ViewStar 3.0 works with Attachmate Extra for Windows for its communications capability. Users can move information from a scanned image into the database or over a remote link without switching programs.

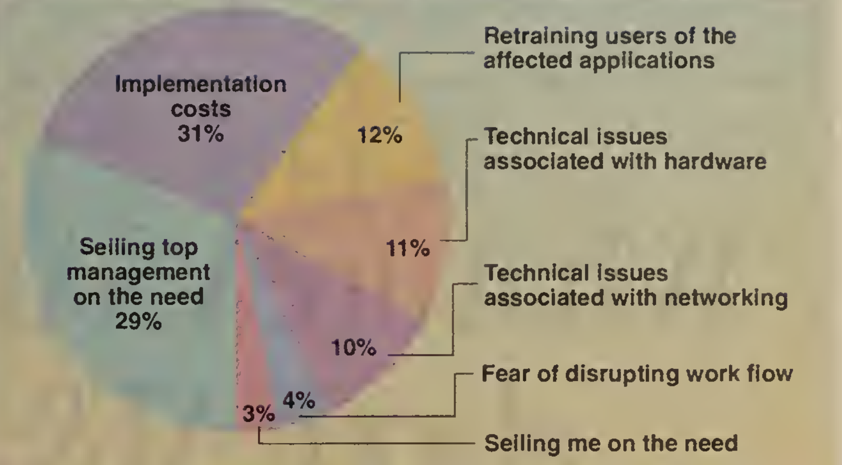
ViewStar 3.0 also supports Microsoft's Dynamic Data Exchange (DDE), Windows' interapplication communications facility. DDE lets programmers automate more of the work flow by linking the ViewStar client to other Windows programs.

For example, an incomplete invoice could trigger a DDE event that would launch a word processor, feed the name and address into a template and generate a form letter that would request the sender supply the missing information. Conversely, DDE can image-enable other DDE-compliant applications by giving them access to ViewStar's repositories, the company said.

(continued on page 36)

Issues delaying acceptance of client/server

Which of the following reasons is most likely to cause significant delay in the adoption of a client/server model in your organization?



Based on a recent survey of 366 Dun & Bradstreet Software customers.

GRAPHIC BY SUSAN SLATER

SOURCE: D&B SOFTWARE, FRAMINGHAM, MA.

Users trudge along client/server path

D&B Software survey finds firms implementing the technology but still having a tough time of it.

By Timothy O'Brien
West Coast Bureau Chief

ATLANTA — Despite the fact that corporations are implementing client/server applications in increasing numbers to effect changes in business operations, users still view the transition as onerous and time-consuming.

Those are a few of the findings of a recent customer survey commissioned by Dun & Bradstreet Software.

"The good news is that the message of client/server is finally getting through," said John Pepe, senior vice-president of engineering and customer support at D&B Software. "However, it is discouraging that many users still perceive this change to be extremely difficult."

The survey was conducted recently at D&B Software's annual user conference, which attracted 2,400 users representing 75% of the Fortune 500 firms. The study was conducted by Strategic Marketing Decisions, an Atlanta research firm, and includes interviews with 366 information systems (IS) managers.

A key finding of the survey is that 59% of the respondents are in the process of applying business reengineering methodologies to their operations, and almost all say the task will be complete within three years.

The major reasons cited for business reengineering are more efficient and streamlined operations, improved customer service, increased productivity and cost reduction.

In terms of making the move to client/server technology, more than half of the participants say they have already implemented client/server applications, mostly in the area of financials.

Users say the most important reasons to implement client/server applications are to improve customer service and gain flexibility in meeting user needs.

> More than half of the participants say they have already implemented client/server applications.
>
> ▲▲▲

But 50% of the IS managers surveyed believe adopting client/server solutions will be a difficult task, a significant increase over the 37% who expressed the same concern in the D&B Software survey last year.

Although high implementation costs and difficulty in getting management approval are the

(continued on page 36)

Users trudge along client/server path

continued from page 35

chief reasons given for the increased caution, other factors such as retraining, technical issues with hardware and networking, and the fear of disrupting work flow are also mentioned.

Furthermore, 66% of the respondents say the industry as a whole has not done a good job explaining client/server technology and its associated benefits. In last year's survey, 74% made the same claim.

Pepe said he hopes D&B Software's recent product announcements and corporate commitment to provide a gradual migration path to client/server applications will help reverse some of the industry's perceptions about the technology. With more than 12,000 customers worldwide, D&B Software eventually plans to offer its widely used host-based programs as local-area network-based client/server applications.

The first new products, expected to be available this month, are front-end decision support tools that can be used in conjunction with existing mainframe applications. One new offering, SmartStream, is a personal computer-based analysis tool that allows users to manipulate mainframe data and port it to a spreadsheet.

Also announced recently were new Unix-based versions of host applications, which are due out by the end of the year. However, these Unix applications are still terminal-based rather than networked. In addition, they are geared to users wanting to downsize applications to less expensive platforms, not to those moving fully to client/server LAN environments.

Pepe said the larger effort at D&B Software involves the rebuilding of the company's host-based applications into LAN-based applications using Powersoft Corp.'s PowerBuilder client/server development tools and Sybase, Inc.'s SQL Server as the back-end server engine, with other databases to follow.

"We are rearchitecting all of our core host-based applications in order to provide new client/server versions," Pepe said. "We plan to have the first of these products available by the first quarter of 1993."

What are VSAT users saying about AT&T Tridom?

Best Overall

AT&T Tridom

Consistent performance in all categories propelled AT&T Tridom to the top spot in this DATA COMM User Survey. The company's VSAT network offering placed first in eight of the 16 technical and service categories. AT&T Tridom earned its highest marks for network reliability and availability, its support for different data types and protocols, and the quality of its technical help and installation efforts.

BEST PRICE/ PERFORMANCE

AT&T/Tridom	56%
GTE Spacenet	19%
Cylix Communications	9%
Hughes Network Systems	6%
Scientific-Atlanta	6%
World Communications	3%

the YankeeGroup

The company (AT&T Tridom) is better positioned than other vendors to build networks that combine VSAT technology with AT&T terrestrial high-speed point-to-point links. Another strength is its shared hub service capability. Although Tridom has less shared hubs than its competitors, the three hubs are all located at AT&T central offices, providing greater sophistication of control and reliability than that of its competitors.

PREFER TO DO BUSINESS WITH

AT&T/Tridom	77%
GTE Spacenet	10%
Cylix Communications	6%
Hughes Network Systems	4%
Scientific-Atlanta	4%

BEST TECHNOLOGY

AT&T/Tridom	72%
GTE Spacenet	14%
Hughes Network Systems	14%
Cylix Communications	5%
Scientific-Atlanta	2%

Best Technology

AT&T Tridom

AT&T Tridom rated tops in five out of eight technology categories. It was the only vendor to achieve a rating of more than 3.0 for its ability to integrate with other network management systems. The vendor also earned high marks for the quality of its diagnostic features and performance monitoring tools.

BEST SERVICE/ SUPPORT

AT&T/Tridom	74%
GTE Spacenet	12%
Cylix Communications	9%
Scientific-Atlanta	3%
World Communications	3%

BEST DOCUMENTATION

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Cylix Communications	4%
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It shows in the 1992 *Users' Choice* survey conducted by *Data Communications* in which AT&T Tridom was voted the *Best Overall VSAT Vendor* with the *Best Technology.*

And it shows by what industry analysts are saying. A recent *Yankee Group* report lauded AT&T Tridom's shared hub service capability, technical superiority, and facility for combining VSAT technology with terrestrial data services.

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Circle Reader Service #102

Imaging tool sports new feature pack

continued from page 35

Via its own proprietary mechanisms, Version 3.0 can also launch or feed data to another DDE-compliant program that is running on a different workstation over the network. The program will support Microsoft's NetDDE when it ships in Windows for Workgroups later this year.

Version 3.0 also offers a wider range of scalable database support. The imaging software now works with Microsoft and Sybase, Inc.'s OS/2 SQL Server in addition to Gupta Technologies, Inc.'s database.

Supporting vertical or horizontal partitioning, the new software also stores tables at a central database to point to additional information stored elsewhere. "Instead of having data in one central location, you can have it dispersed throughout an environment," said Barbara Wehrle, director of marketing at ViewStar. "With 386 or 486 [database] servers, if you want to add more capacity, you just add more servers."

ViewStar will support IBM's DB2 (running on MVS mainframes) and Sybase's SQL Server (running on AIX-based IBM RS/6000s) in the third quarter.

Version 3.0's work flow automation component has been rewritten to include several levels of tasks and subtasks that can be invoked through a point-and-click interface.

A preconfigured library of standard tasks helps managers and programmers create more applications through the Windows interface rather than ViewStar's fourth-generation programming language. The standard tasks in the library can also be customized or refined through the fourth-generation language.

Horizon releases text retrieval software

continued from page 35

ity and viewing features for an increasing number of applications, such as Microsoft Corp.'s Word, WordPerfect Corp.'s WordPerfect, Lotus Development Corp.'s 1-2-3, Borland International, Inc.'s dBase and others. However, any ASCII or EBCDIC file resident on a disk can be searched.

In addition to the search functions, the new version of the text retrieval software has a new memory-resident capability and the ability to cut and paste between files.

Power!Search 1.1 is available now and sells for $99 for a single-user version, $495 for a six-user LAN version and $995 for an unlimited-user version.

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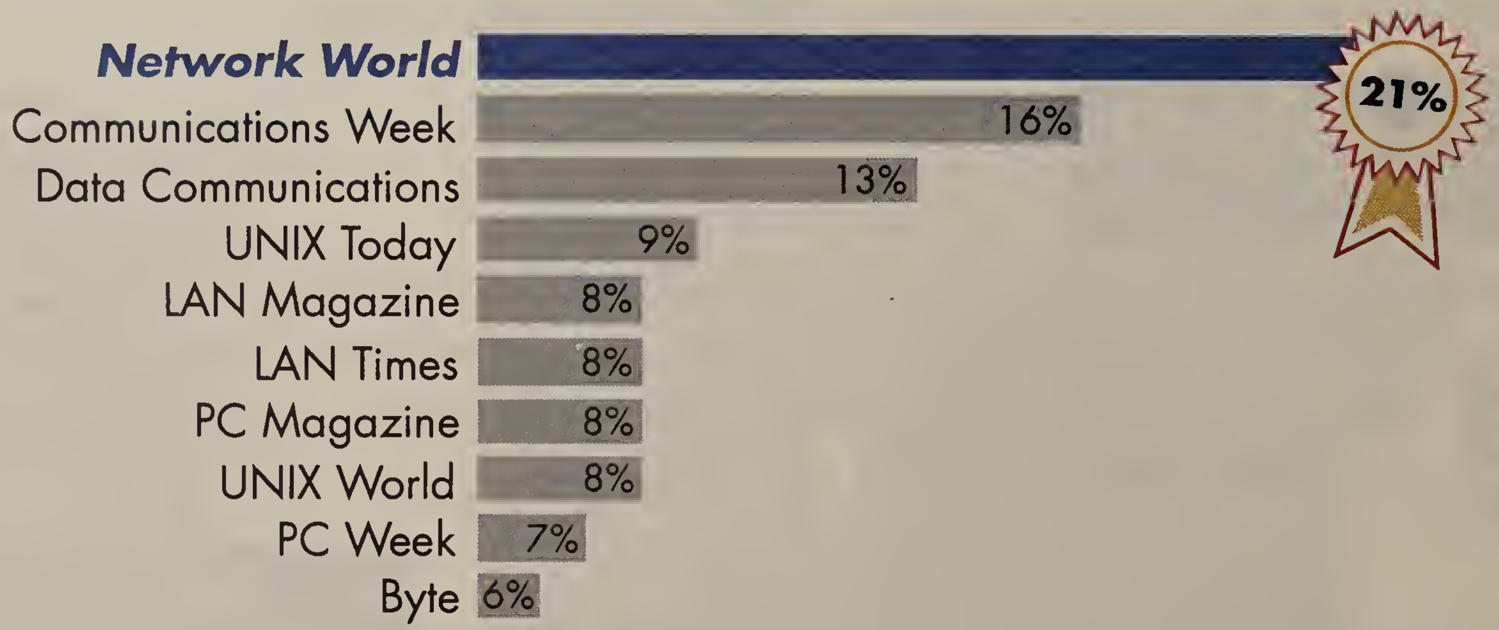
Interop Attendees Pick Network World Over 120 Different Publications

"Which publication do you read regularly related to your profession?"



In an independent study, attendees of Interop Fall '91 were asked on an unaided basis which publication they read regularly related to their profession and which publication provided the best information about internetworking. ***Both times, they chose Network World the best in the industry.***

From among 120 other publications, they answered Network World, first and foremost, because Network World is their primary source for information on every facet of the enterprise network - from corporate backbone networks to departmental LANs.

Interop is a major conference and exhibition for multivendor network computing and internetworking products and services. And the people who attend the show are some of the industry's leading buyers, purchasing many of the products that comprise enterprise networks including bridges and routers, FDDI, hubs, TCP/IP, network management, WANs and LANs. In fact:

- *55% of attendees belong to firms with 1,000+ employees*
- *43% spent $1 million+ on data and telecommunications in 1991*
- *82% have a buying role in the purchase of products displayed at Interop*
- *75% of the attendees plan to attend Interop '92 Fall*

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March 9, 1992

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Apple lays out net future of System 7

Demos Open Collaboration Environment Toolbox, details new multiprotocol network architecture

Survey: Downsizing taking root in corporate America

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FEATURE

Market flux forces users
rethink int'l hub sites

NETLINE

Source: Audience Survey of Interop Fall '91 Exhibit Survey, Inc.

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS, ALLIANCES AND FINANCIALS

Worth Noting

"IDC forecasts a steady shift away from internal IS spending toward external spending with [information technology] suppliers. Vendor revenue growth in 1992 [will] exceed that of total customer spending, particularly in software, services and networking."

David Moschella
Senior vice-president of research
International Data Corp.
Framingham, Mass.

People & Positions

Tekelec, Inc., a Calabasas, Calif., test equipment maker, last week named **Vincent Dugan** vice-president of marketing. He will be responsible for managing Tekelec's product marketing and marketing communications group worldwide.

Dugan replaces **Robert Hess**, who has taken over as vice-president and director of sales development for the company's new Eagle signaling switches. Previously, Dugan was vice-president of project management and customer engineering at Computer Consoles, Inc. in Rochester, N.Y.

Digital Microwave Corp. has named **Michael Michigami** its chairman and chief executive officer. He will succeed Michael Friedenbach, who will retire.

Previously, Michigami was president and CEO of Datapoint Corp. in San Antonio, Texas. Digital Microwave is a San Jose, Calif., maker of short-haul transmission products.

RBHCs press Congress for entrance to long-haul mart

Say rate reductions not caused by competition.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — The regional Bell holding companies recently told Congress they should be allowed into the long-haul business because users have not seen any real drop in long-distance prices since the Bell System breakup.

The often-quoted 40% reduction in long-distance rates since divestiture has resulted from local-access charge rate reductions ordered by the Federal Communications Commission, not competition among carriers, said Robert Levetown, vice-chairman and general counsel of Bell Atlantic Corp. He claimed customers are unlikely to see any real cuts until the RBHCs are allowed to compete in the long-distance arena.

> "The toll rate reduction does not represent an overall consumer savings."
>
> ▲▲▲

"The American public has paid for the reengineering of the telephone network to promote full long-distance competition, including price competition," he said. "Congress should permit the public to get what it paid for."

Levetown testified on behalf of the RBHCs at the first House Telecommunications Subcommittee hearing focused solely on lifting the Modified Final Judgment ban on RBHC provisioning of long-distance services.

He claimed long-haul rates dropped because the FCC ordered access charges that would have been billed to AT&T and other carriers to be posted as flat-rate additions to local phone bills.

"The toll rate reduction does not represent an overall consumer savings, and none of it was caused by price competition among interstate carriers," Levetown said. He further noted that consumers and small businesses have carried the weight, while "the large companies have made out like bandits."

But critics charged that the RBHCs are only interested in entering the long-distance arena in their own regions, where they have home-field advantages. Among other things, they claimed, the RBHCs could discriminate against competitors in provisioning and pricing.

Levetown said the Bells would not settle for rules that would allow them to offer long-distance service only outside their territories. "This is not the kind of service people want," Levetown said. "It's not complete."

Robert Harris, associate professor at the Haas School of Business at the University of California, Berkeley, testified that the interexchange carrier ban should be lifted because local competition has increased.

Harris said the Bells are prepared to provide interexchange carrier services today because they've already built extensive tandem-switched long-haul networks. "They have a capacity even MCI doesn't have," said Harris, who works as a paid consultant for the Bells.

Bell companies contacted last week said they have built fiber nets between local access transport areas in their own regions as private networks, as is permitted.

Whether those networks could carry customer long-haul traffic is another issue. Bell Atlantic said there is no significant idle capacity on its T-1 network, and Pacific Bell said it does not have extra capacity on its 405M bit/sec long-distance network, dubbed PB Net.

At the hearing, Jim Kilpatric, senior vice-president of law at AT&T, and James Smith, president of the Competitive Telecommunications Association (COMPTEL), said the RBHC's bottleneck control over the local network is the main reason they oppose Bell entry into long distance.

"I think you'd see a lot of Mr. Smith's customers squeezed out [if the Bells entered the interexchange carrier business],' Kilpatric said.

But Kilpatric and Smith did little to rebut the RBHC assertion that reductions in long-distance prices are largely due to regulatory decisions pertaining to access charges.

IBM focuses on OEMS

Sampling of gear IBM sells to other vendors

Network products

☐ 3270 adapters
☐ 3172 Interconnect Controller
☐ 16/4M bit/sec Token-Ring Minicard
☐ Token-Ring Network PC adapters
☐ 16/4M bit/sec Token-Ring Adapters

AS/400 and related products

☐ IBM Automotive Diagnostic System
☐ 9102 Models D02, D04 and D06

Enterprise System/9000 and Enterprise System Connectivity (ESCON) products

☐ ESCON Directors Models 1 and 2
☐ 9034 ESCON Converters

RS/6000 and components

☐ POWERstation and POWERserver Model 220
☐ Series 300 and 500 POWERstations and POWERservers

GRAPHIC BY SUSAN SLATER

SOURCE: IBM, PURCHASE, N.Y.

IBM seeks to boost OEM product sales

Puts executives in place with plans to drive up original equipment sales to $3 billion by 1993.

By Michael Cooney
Senior Editor

PURCHASE, N.Y. — IBM last week outlined plans to bolster original equipment sales to other vendors, an effort that is expected to result in $3 billion worth of OEM sales by 1993.

In an OEM directional meeting for industry analysts, IBM said it has assigned senior-level executives to each of its eight lines of business (LOB) who are solely responsible for handling OEM business for that unit's products.

"OEMing was not a major focus at IBM in the past, but that's changing," said Pat Toole, IBM's senior vice-president of manufacturing and development. "We will OEM everything from manufacturing processes to software code. It is a complicated, emerging opportunity for us."

With its bottom line shrinking and its newly independent business units calling many of their own shots, the LOBs want to use their newfound freedom to become influential OEMs, analysts said.

Since IBM network and mainframe solutions are the glue that hold many enterprises together, analysts said these two LOBs are under more pressure to succeed in selling their products to other vendors.

But the Networking Systems (NS) LOB has a long way to go, given it will contribute a rather modest $50 million to a company OEM total of $1 billion for this year, said Pete Soutter, director of NS OEM. NS sells 3270 adapters, 16/4M bit/sec Token-Ring Adapters and will move into selling the 3172 Interconnect Controller.

"NS has 40 to 50 OEM contracts now, and we expect to add 15 to 20 more this year with [more OEM] growth beyond 1992," Soutter said.

By comparison, IBM's Enterprise Systems is expected to generate $100 million in OEM business by 1993 by selling Enterprise System Connectivity (ESCON) Converters and Directors, which control ESCON's fiber-optic channels. Its Technology Products LOB, which deals primarily with semiconductors, expects to contribute $150 million this year alone.

For NS' part, Soutter said its OEM strategy will help users by driving potential de facto IBM standards such as its much vaunted Advanced Peer-to-Peer Networking (APPN) Network Node technology into the marketplace, a strategy IBM has never tested before.

"APPN will help SNA users integrate their SNA networks with the emerging LAN interconnect backbones and by OEMing that technology, we'll be able to get it in place quicker," Soutter said. "OEMing also gives customers guaranteed IBM compatibility."

(continued on page 72)

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MANAGEMENT STRATEGIES

ENTERPRISE NETWORK STRATEGIES, USER GROUPS AND MANAGING PEOPLE AND TECHNOLOGY

Worth Noting

> "Users are now asking for off-the-shelf customizable software."
>
> **Carl Olofson**
> Senior product consultant
> Manager Software Products, Inc.
> Lexington, Mass.

Manager Minutes

The first **North American EDI Coordinator's Conference** will be held Dec. 2-3 in Phoenix. The conference, sponsored by the EDI Center of Sterling Software, Inc., will include hands-on, interactive working sessions covering issues facing electronic data interchange coordinators.

Sterling Software established the EDI Center in 1985 to meet the growing need for practical, real-world education about EDI.

Session topics include the role of the EDI coordinator, how to create a trading partner implementation package, change management in an EDI environment and getting EDI user commitment.

The registration fee is $355. For more information, call (614) 793-7382.

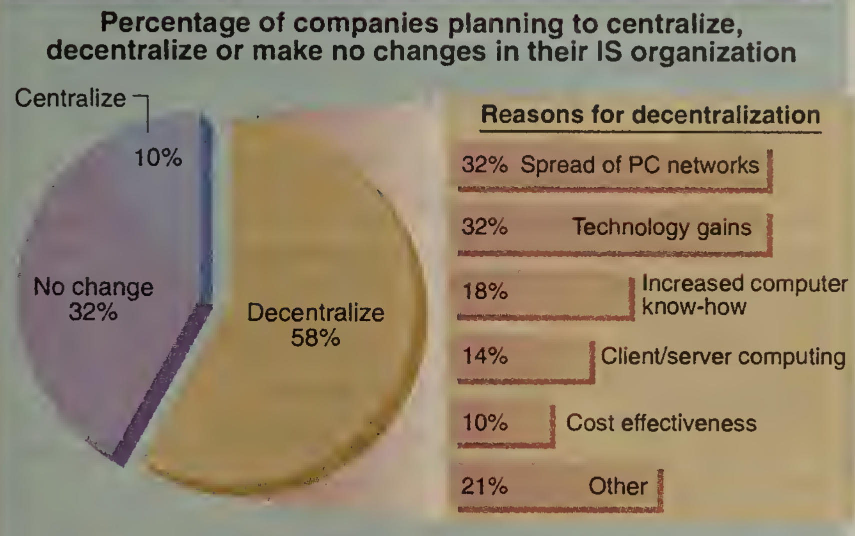
The **1992 Macintosh Connectivity Conference** will be held July 14-16 at the Santa Clara Convention Center in Santa Clara, Calif. The conference will focus on issues involved in networking Apple Computer, Inc. Macintosh computers on local-area and enterprise nets.

The conference will offer more than 70 sessions dedicated to connectivity issues. Also, more than 60 vendors will exhibit their products.

The cost of the conference and exhibition is $895. The one-day seminars cost $445 each, and entrance to the exhibits for all three days is $20.

To register for the conference, call (800) 798-2928.

IS decentralizes



Based on a survey of 251 chief information officers at major U.S. companies. Respondents gave multiple responses for why they plan to decentralize.

GRAPHIC BY SUSAN SLATER

SOURCE: GATEWAY INFORMATION SERVICES, INC., NEW YORK

MANAGING TECHNOLOGY

BY ERIC SCHMALL

PC-based net resources amplify threat of viruses

No matter how seasoned network managers may be, they won't ever forget their first encounter with a widespread viral outbreak.

Until recently, network professionals earned their spurs in security by battling voice mail hackers, toll abusers and those who obtain unauthorized access to mainframes.

Now with personal computers serving as platforms for local-area network components, it doesn't take much imagination to envision viruses that could take down an entire network. Even worse, PC-based net components could ultimately infect end-user workstations as users log on to the network.

At the top of the list of ways to guard against this compelling threat is to see that employees are regularly using some form of antiviral scanning tools.

Although users are generally reluctant to comply with such requests, managers can ensure some compliance by automating the process. LAN servers can be loaded with software that enables attached PCs to be scanned each time users log on to the network.

Net managers should be equally concerned about PC-based LAN/wide-area network junctures. Network staff should perform specific and regular inspections of these PC-based choke points and carefully load new software upgrades. It isn't unreasonable to demand that all diskettes containing upgrades be thoroughly scanned before they are used.

Accommodating these procedural changes requires a serious attitude shift not only for the technical professionals, but for the senior staff as well. Viruses present a clear and present danger to the integrity of modern networks.

Instruct your management as well as the rank and file that finding a virus in the network is no less serious than finding an undetonated bomb under the network control room's raised floor. Such a comparison is no idle exaggeration. It constitutes the grim reality of current and future network operations.

Users enthused about electronic meetings

Group support software boosts productivity, improves decisions, and saves time and money.

By Wayne Eckerson
Senior Editor

Companies have used computers to automate payroll processing, accounting and document generation and management, almost everything except the task that occupies the largest part of many workers' time — meetings.

Seeking to meet that need, Ventana Corp., IBM and Collaborative Technologies Corp. have introduced local-area network-based group support software designed to improve the quality and productivity of business meetings and group decision making.

Early users of the products are ecstatic. They say the software has enabled workers to generate ideas in a fraction of the time, effectively saving companies bundles of money. The offerings also make it possible for participants to contribute equally during meetings and foster greater buy-in to group decisions.

Electronic meeting participants use a LAN-attached personal computer to record comments, cast votes or evaluate alternatives in response to a question or problem posed by the meeting facilitator. The group support software, which resides on a LAN server, automatically records the information and broadcasts it to other users who view the group information in a window on their computer screen.

Many users are already piloting new versions of the software that do not require users to be present at the same time or place to conduct a business meeting. The new versions let users access the electronic meeting software at their leisure usings PCs in their home or office.

Marriott Corp. implemented Collaborative Technology's VisionQuest last October to improve decision making at all levels of the company. The product, which has been implemented on 14 PCs and a server linked in a Novell, Inc. NetWare LAN, has been used by more than 3,000 workers who have generated 30,000 ideas, according to Carl DiPietro, vice-president of human resources at the firm.

DiPietro said the electronic meetings take an average of one-tenth of the time of traditional meetings because users can submit ideas simultaneously instead of waiting their turn to speak to a group. This has saved Marriott about $1 million in worker productivity. "We've had groups accomplish in 12 hours what previously took 20 days," he said.

In addition to enhanced worker productivity, the offerings improve the dynamics of group meetings, primarily because they let users contribute ideas anonymously.

"[Group support software] puts everyone on an equal footing. It helps even the shiest person contribute ideas and be heard," said Barbara Meyers, director of strategic technology resources at MetLife, which installed VisionQuest in January.

> "We've had groups accomplish in 12 hours what previously took 20 days."

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Electronic meetings effectively strip the ego away from the idea, eliminating a lot of conflict and politics that can undermine traditional meetings, users said.

Implementation tips

While group support software is an effective tool, users cautioned that it alone cannot guarantee productive meetings.

Tom McMillen, manager of corporate information systems at Greyhound Financial Corp., said it is imperative that companies have a trained facilitator running electronic meetings. Greyhound purchased Ventana's GroupSystems product last year.

Meyers said it is critical to have a well-defined goal to achieve in an electronic meeting. "Unless you plan ahead," she said, "your [electronic meeting] will get off track very quickly."

OPINIONS

MILESTONES

BY ANITA TAFF

Network users are forever indebted to MCI's McGowan

The passing last week of William McGowan, chairman of MCI Communications Corp., brought to a close an era in the telecommunications industry. He was instrumental in transforming a telecommunications market dominated by a 100-year-old stagnant monopoly into a fiercely competitive industry.

Although McGowan did not found MCI, he brought it from a struggling, financially strapped firm to a multibillion-dollar company. And he did it by taking on the largest corporation in the world at the time — AT&T.

But more than by the financial successes he achieved, McGowan should be judged by the way in which he carried out the battle. McGowan graduated from Harvard Business School and initially made his mark on Wall Street helping put financially strapped companies back on their feet. He could have stayed on Wall Street in a plush office, surrounded by luxury and power, never lacking for resources. Instead, he took on a challenge that many thought crazy and drove himself, perhaps too hard at times, to pry open a place for competition in the telecommunications industry. He spent months and years in courtrooms, regulators' offices and lobbying on Capitol Hill.

> Though McGowan is gone, his legacy will live on in the industry he helped transform.
>
> ▲▲▲

When it came to winning battles for MCI, he was on a mission. To listen to McGowan, MCI was almost an orphan child that he took under his wing and nurtured until it was strong enough to stand on its own.

And yet, McGowan never got so jaded or cynical about the process — which often moved at glacial speeds — that he lost his sense of humor. Even near the end of his life, McGowan continued to make fun of himself with devastating wit.

McGowan received a heart transplant in 1987 and despite the ordeal of surgery and never-ending drug therapy that lowered his resistance and made him prone to infections, he frequently joked about the experience. In public appearances following his transplant, McGowan would frequently open by thanking the organization for inviting him to speak. He would then say he was glad to be there, adding, "But considering my condition, I'm glad to be anywhere." The first few times he opened a speech that way, the auditorium was filled with nervous laughs, which seemed to amuse him as much as his own crack.

And despite McGowan's considerable prowess in and frustration with the regulatory process, he saw humor there as well. He used to joke that if he ever had to have another heart transplant, this time he would ask for a heart from a telecommunications attorney. "That way I'll know it was never used," he would say.

McGowan collapsed last week from a heart attack on his way to a routine doctor visit. His words seem strangely prophetic now.

Even though McGowan is gone, his legacy will live on in the industry he helped transform from a monopolistic system to a competitive, vibrant marketplace in which users have a multitude of choices not dreamed of 20 years ago. ◼

Taff is Network World's *Washington bureau chief.*

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EDITORIAL

Network World announces new Reader Advocacy Force

One of the most important responsibilities of any publication is to serve as an advocate of its readers.

That's a responsibility we take very seriously. Since *Network World* was launched in 1986, we've focused on promoting the interests and airing the concerns of network users. And we're pleased to announce this week an expanded advocacy role for *Network World* with the formation of the Reader Advocacy Force (R.A.F.).

The R.A.F. is a team of reporters and editors brought together to address the key issues facing users of network products and services. It will serve as the voice of network buyers, spotlighting product problems, service and support concerns, interoperability issues and other topics on the minds of our readers.

In the months to come, we'll be producing a steady stream of R.A.F. articles that shed light on the problems users confront in trying to build and manage their enterprise networks.

The first R.A.F. article examines whether the dream of Open Systems Interconnection is dead. It is based on original research commissioned by *Network World* and interviews with prominent users, vendors and consultants, as well as leaders of open systems groups, vendor consortia and technical forums. The story outlines what steps the industry must take to ensure a future in which products are truly interoperable.

In order for the R.A.F. to really serve readers, we need your help. Because we want to hear from you about the topics we ought to cover, we've established a toll-free R.A.F. hot line as well as an R.A.F. Forum on our electronic Bulletin Board System (BBS). To use the hot line, dial (800) 622-1108 and ask for Ext. 487. For instructions on using the BBS, see page 2. You can also reach us at the address and telephone numbers listed in the masthead above.

We want to hear from you so that we may serve you better. ◼

MACROSCOPE

BY JAMES KOBIELUS

E-mail addressing should be more user-friendly

Problems with managing users' electronic mail addresses, such as E-mail addresses that are difficult to remember, are keeping many E-mail systems from being truly user-friendly. These problems are exacerbated by net managers' insistence on assigning addresses for their own convenience rather than for the convenience of users.

But network managers who implement systems using the X.500 directory services standard will find they can have their cake and eat it, too. In other words, they can assign addresses that are easy for users to remember and easy for network staffers to administer.

One problem we all have is keeping track of our business associates' diverse messaging addresses. Who can remember the character strings that must be input to connect us to various terminals and E-mailboxes?

Our business cards are groaning under the weight of all these heavy-duty alphanumeric addresses. Life is too short, for example, to recall the 40-plus characters in the standard X.400 address, much less type them in without error.

The problem is not so much with X.400 or any other message addressing scheme in the abstract, but with the manner in which user addresses have traditionally been assigned.

In general, system administrators create addressing schemes geared for their own convenience. Each new terminal or messaging service added to the network means a new puzzling character string must be created, and we and our correspondents must keep track of it.

The long-range solution to address proliferation lies within integrated messaging systems built around shared X.500 directories. A shared X.500 directory will enable users to send E-mail without knowing the addresses of message recipients. With X.500, users can create private address books on their workstations that are separate from the shared network directory.

A private address book would enable users to create addresses comprised of nicknames or other descriptors rather than the character strings net administrators have assigned. Users can then plug their chosen address into a message and let the shared X.500 directory translate it into the longer, underlying address required to route the message to the recipient.

> Administrators create addressing schemes geared for their own convenience.
>
> ▲▲▲

The shared directory might also provide instructions for converting between messaging media — such as from data to fax — depending on the nature of the receiving terminal.

Another address management problem is looking up addresses for people whose names we don't know.

Let's say you want to send a follow-up message to all the people who received a carbon copy of a message from the boss in January of last year. Or you might want to distribute a message to all people within a certain department, but you only know the name of the department head. Or perhaps you want to send a document to other people who share your interest in a particular topic.

X.500 will be able to assist you in all of these scenarios. In the first case, the X.500 client component — the Directory User Agent (DUA) — could retain all addresses on all messages you receive, allowing you to exchange messages with all others that received a carbon copy of a message.

In the second case, the DUA could assist in formulating queries on organizational affiliations and other fields of data in the X.400 address stored in the server component of the shared directory — the Directory System Agent (DSA). The X.400 address contains fields that describe in detail the organization with which a user is associated. This makes it possible to obtain a list of users in an entire department by searching the organization field, for example.

In the third case, the DUA could initiate queries on the DSA — subject to privacy-related access controls — for a list of people who accessed particular databases, documents or bulletin boards. In this way, a user can quickly compile a mailing list of like-minded individuals.

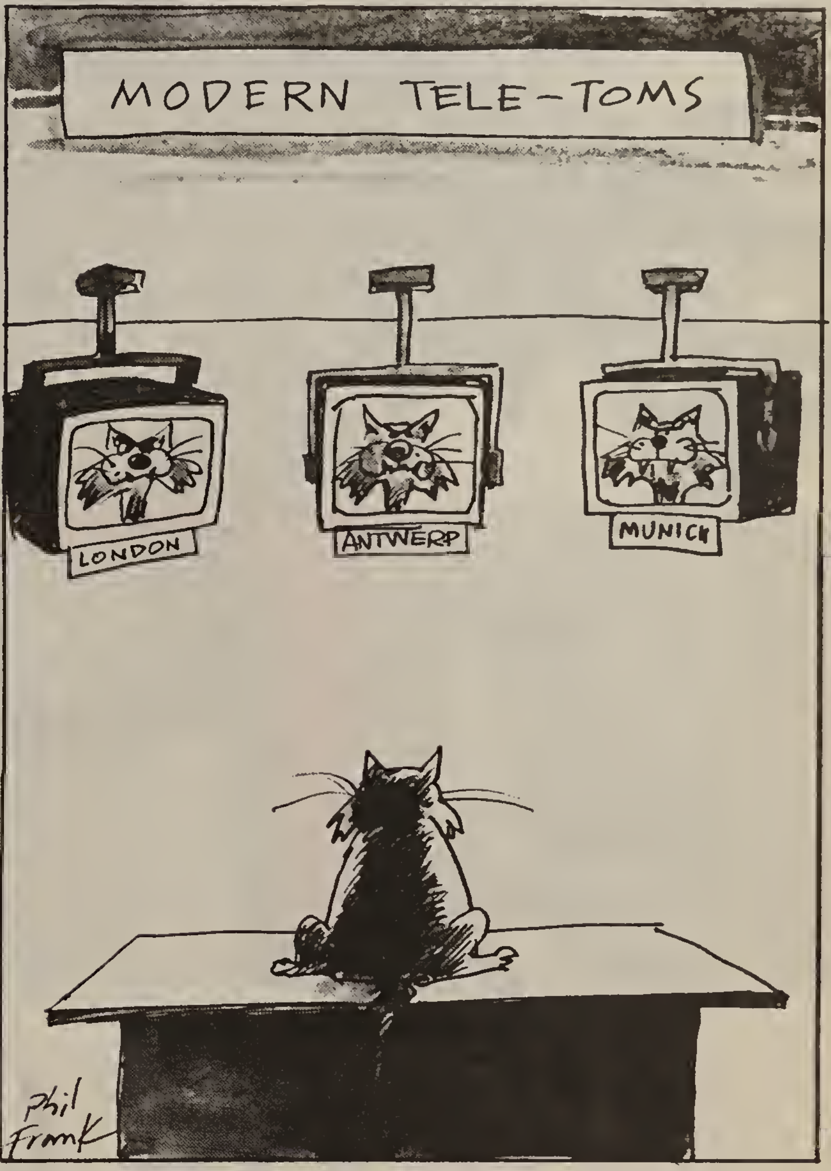
The concept of X.500 directory services may seem rather advanced, but it is really just new clothing on an old idea. Voice telephony has had directory services — both operator-assisted and in printed form — for almost as long as the industry has been in existence.

It's high time that the data communications world established a universal directory scheme to help users get in touch with one another. ◘

Kobielus, a contributing editor to Network World, *is a telecommunications analyst with Fairfax, Va.-based Network Management, Inc., one of the largest local-area and wide-area network systems integrators in the U.S.*

TELETOONS

BY FRANK AND TROISE



LETTERS

Publication misinformed

I'm writing regarding your recent story "MFS shares blueprint for expansion thru acquisition" *(NW,* June 1). To say I was surprised is to minimize my reaction to the inaccuracies this story contained. The article stated that Metropolitan Fiber Systems, Inc. had plans to take over my company.

It is a mystery to me where this information originated. But it is totally false. What I find equally disturbing is the fact that the information was not corroborated.

Corroboration would have revealed the information for what it is — just plain wrong. Mistakes like this have no place in such a reputable publication as *Network World.*

Jeffrey Roe
Vice-president
Digital Direct of Seattle, Inc.
Seattle

Editor's response: Network World *regrets the error.*

Do you disagree with an article you've read in Network World? *Write us a letter about it.*

Hard copy should be typed, double spaced and mailed to Editor, Network World, *161 Worcester Road, Framingham, Mass. 01701 or faxed to (508) 820-3467. If you prefer, letters can be sent via MCI Mail at 390-4868 or uploaded to our Bulletin Board System. (See page 2 for BBS instructions.)*

Letters may be edited for space and clarity.

HAVE YOU SURVIVED AN ALLIGATOR ATTACK? If you solved an unforeseen problem that plagued your network, write an article about it for our "Alligators in the Swamp" section.

Alligators should be 1,200 words in length and submitted on disk, via modem or through MCI Mail at 390-4868.

If you have an idea for an Alligator article, call Susan Collins, associate features editor, at (508) 820-7413 or fax your idea to us at (508) 820-3467.

ATTENTION PEER-TO-PEER LAN OS VENDORS: *Network World* would like to list your product in a Buyer's Guide covering the latest developments in peer-to-peer local-area network operating systems for the Aug. 17 issue. To obtain a survey form, please call Charles Bruno, features editor, at (508) 875-6400, Ext. 414.

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DIGITAL PRIVATE-LINE SERVICES

Buying on the commodity market

By DANIEL BRIERE

Once considered a premium service when compared to analog facilities, digital private lines are quickly reaching commodity status. Today, the backbone networks of nearly every interexchange carrier are totally digital and nary an analog leased-line service can be found.

This backbone digitization has enabled carriers to provide very similar levels of private-line services. In fact, carriers now match one another for the most part on a feature-by-feature basis.

Digitization has also improved the quality of public network services to the point where a switched digital circuit can provide the same transmission quality as a private line and often at less cost.

Since there is very little difference between private-line features and switched services as a viable alternative, users quickly find that pricing is the biggest factor when buying a private line. And the news on this front is not all good. Private-line prices have stabilized after years of steady decline and, in some cases, have even inched upward.

CHART • GUIDE

Buyer's Guide charts on domestic and international private-line services begin on page 48. A chart on domestic private-line options is on page 65.

The one silver lining users will find in the private-line pricing cloud is that carriers are offering promotional plans that are often customized to suit the needs of a particular customer.

For those who would rather select a service based on more than just price, an evaluation of network management capabilities and optional features, such as alternate routing, central office-based multiplexing and route diversity, is in order. Items such as service quality and installation time are also important, but here, too, there is little difference in what various carriers offer.

Nearly every carrier offers a full range of private-line circuit speeds, from T-3 to 56K bit/sec.

Scoping out the market

It seems that everyone is talking about massive allocations of bandwidth for applications, prompting some to believe that T-3 backbone networking will take off. But T-3 has not yet caught on.

T-3 services are positioned to satisfy the bandwidth demands of applications that require increased capacity on private networks, such as computer-aided design and manufacturing, host-to-host file transfer and even videoconferencing.

While average interexchange carrier T-3 prices dropped between 15% and 20% since 1991, T-3 services are still somewhat expensive for many users' tastes. High installation costs and monthly fees for local T-3 access circuits are major reasons why users have not rushed to embrace T-3.

In order to provide a migration path to T-3 services, a few carriers offer fractional T-3 services that allow users to receive portions of a full T-3 line, usually in T-1 increments, at a lower cost than buying a number of T-1 lines.

While T-3 services haven't quite caught on yet, T-1 and fractional T-1 services can be found in the private networks of most large users, and prices are inching upward. "You can expect a 3% to 4% per year increase on all of AT&T's services, but you can also expect an increase in promotional specials, too," says Michael Hills, presi-

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With carriers offering similar service levels, price becomes the major factor in a private-line purchase.

Domestic private-line services

Carrier	Service	Service speed						Local access methods						Service coverage		Rate methods			Onetime charges				Monthly charges			Maximum downtime (1)		Average installation interval (days)
		Digital data services	DS0	Fractional T-1	T-1	Fractional T-3	T-3	VGSA	VGSW	DDSA	Fractional T-1	DS1	DS3	LATAs served	POPs with service	Mileage-based	ICB	City-pair specific	Installation	Order	Access coordination	CO connection	Access coordination	CO connection	Local channel	Errored retransmission	Downtime	
Advanced Telecommunications Corp. (800) 741-1992	Fractional T-1			✓							✓			61	58	✓			$400	$150	$0	$0	$0	$0	ICB	0.15%	0.05%	29
	Fractional T-3					✓							✓	61	58	✓			$900	$150	$0	$0	$0	ICB	LEC + 10%	0.15%	0.05%	ICB
	Lasernet 64	✓	✓					✓	✓	✓		✓	✓	61	58	✓			$200	$150	$0	$0	$0	$0	LEC + 10%	0.15%	0.05%	29
	Lasernet 1.544				✓							✓		61	58	✓		✓	$900	$150	$0	$0	$0	$0	LEC + 10%	0.15%	0.05%	29
	Lasernet 45						✓						✓	61	58	✓	✓	✓	$900	$150	$0	$0	$0	$0	LEC + 10%	0.15%	0.05%	ICB
AT&T (800) 222-0400	Dataphone Digital Service	✓								✓				167	185	✓			$0	$0	$223-$276	$161-$243	$28.65	$20.50-$51.25	LEC + mark-up	0.01%-0.04%	0.1%	30-45
	Accunet Spectrum of Digital Services		✓	✓				✓		✓		✓	✓	196	571	✓			$0	$0	Varies	$201-$513	Varies	$20.50-$51.25	LEC + mark-up	0.01%-0.04%	0.01%-0.15%	30-45
	Accunet T1.5 Service				✓			✓	✓	✓		✓	✓	196	533	✓			$0	$0	$207	$135	$50	$327	LEC + mark-up	0.01%-0.02%	0.03%-0.07%	25
	Accunet T45 Service						✓					✓	✓	143	287	✓			ICB	$0	$2,500	$207	$175	$21.25	LEC + mark-up	0.08%-0.21%	0.03%-0.07%	ICB
Cable & Wireless Communications, Inc. (800) 969-9998	Fiber Point Services	✓						✓		✓				53	67	✓			$200	$0	$0	$50-$100	$0	$25-$50	LEC + 15%	0.02%-0.09%	0.05%-0.15%	30
	Intelli-Flex		✓	✓								✓		35	46	✓			$200	$0	$100	$0	$0	$0	LEC + 10%	0.04%-0.14%	0.1%-0.2%	28
	DS1				✓			✓		✓		✓		45	58	✓			$1,000	$0	$100	$0	$0	$0	LEC + 10%	0.04%-0.14%	0.04%-0.1%	28
	DS3						✓					✓	✓	ICB	ICB			✓	$1,500	$0	$0	$0	$0	$0	ICB	0.01%-0.35%	0.04%-0.08%	ICB
Consolidated Network, Inc. (314) 993-9009	DDS	✓								✓				30	28			✓	$450	$0	LEC	$0	LEC	$0	LEC	0.05%	0.02%	30
	DS0		✓							✓				30	28			✓	$300	$0	LEC	$0	LEC	$0	LEC	0.05%	0.02%	30
	DS1				✓			✓		✓		✓		30	28			✓	$600	$0	LEC	$0	LEC	$0	LEC	0.05%	0.02%	30
	DS3						✓	✓		✓		✓	✓	30	28			✓	$1,000	$0	LEC	$0	LEC	$0	LEC	0.05%	0.02%	30
MCI Communications Corp. (800) 888-0800	Digital Data Service	✓	✓							✓		✓	✓	173	284	✓			$0	$0	$201-$248	$145-$219	$28.65	$20-$45	LEC	0.02%-0.09%	0.05%-0.15%	34
	Digital Private Line Service		✓	✓				✓		✓		✓	✓	187	547	✓			$0	$0	$150-$248	$182-$279	$20-$50	$20-$120	LEC	0.04%-0.14%	0.1%-0.2%	25-34
	Terrestrial Digital Service-1.5				✓							✓	✓	171	391	✓			$0	$0	$186	$279	$50	$120	LEC	0.04%-0.14%	0.04%-0.1%	34
	Terrestrial Digital Service-45						✓					✓	✓	80	120	✓			$0	$0	$2,200	$500	$125	$450	LEC	0.01%-0.35%	0.04%-0.08%	ICB
Metromedia Communications Corp. (201) 804-6400	Digital Data Service	✓								✓		✓	✓	23	83	✓			$300	$0	$0	$300	$12	$19.50	LEC + mark-up	1.9%	0.05%	30
	Fractional DS1 Service			✓								✓		20	150	✓			$300	$0	$0	$300	$10	$19.50	LEC + mark-up	0.04%-0.14%	0.04%-0.1%	30
	DS1 Service				✓			✓				✓	✓	52	ICB	✓			$500	$0	$0	$500	$15	$45	LEC + mark-up	1.9%	0.05%	30
	DS0 and DS3 Service						✓	✓				✓	✓	52	52	✓			ICB	$0	ICB	ICB	ICB	ICB	LEC + mark-up	1.9%	0.05%	30
SP Telecom (415) 905-4000	Private Line Service		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	159	171	✓			ICB	$0	$0	$0	$0	$0	LEC	0.04%-0.15%	0.03%	25

(continued from page 47)

dent of HTL Telemanagement, Ltd. in Burtonsville, Md. "And whatever AT&T does, you can expect other carriers to do too."

Like fractional T-3, fractional T-1 services function as a bridge between full-speed services. Fractional T-1 provides a range of speeds falling between 64K bit/sec and full T-1. These speeds include 112K, 128K, 256K, 384K and 768K bit/sec.

At the low end of the market are 64K bit/sec DS0 services and digital data services (DDS) that offer speeds of 56K bit/sec and lower. It's surprising that private-line services below 56K bit/sec are still available. But at least AT&T, MCI Communications Corp. and Sprint Corp. still offer speeds as low as 2,400 bit/sec.

These lower speed services are gradually being pushed out the door by such alternatives as switched digital services. Another factor in the disappearance of low-speed leased lines is the inclusion of improved error checking and management features in ever-cheaper dial-up modems. Even still, prices for low-end leased lines are going up.

There are still a number of networks that utilize low-speed leased lines, including airline reservation and retail point-of-sale nets, according to Hemant Vaidya, product manager for Accunet HI-CAP Digital Services at AT&T.

Switch to switched services

Despite the little difference among private-line offerings, the decision to install a private line will become increasingly more involved as time passes, especially once users start weighing the benefits of switched services against those of private lines.

Emerging high-speed packet services such as frame relay, Switched Multimegabit Data Services (SMDS) and existing circuit-switched data services could very well offer users the same functionality as private lines. Before long, carriers are also expected to offer virtual private lines, which are public network-based services with the functionality of private lines.

Countering this, however, are new technological advances, such as voice compression, that make private lines more economically attractive. Still, the long-term trends are pushing against private-line services.

Carriers report a decline in demand for the traditional bulwark private-line service, 56K bit/sec DDS. Vaidya says AT&T positions DDS as a premium service and prices it accordingly, making it more sensitive to lower priced competition than other services.

Still, despite the emergence of switched services operating at T-1 and higher speeds, most switched services operate at 56K bit/sec and below.

While private-line services often contend side by side with switched services, the two can complement each other. For example, private lines can be used as the primary links between high-volume sites, while switched services can be used for backup and disaster recovery applications, as well as short-term, tem-

Domestic private-line services

Carrier	Service	Service speed						Local access methods						Service coverage		Rate methods			Onetime charges				Monthly charges			Maximum downtime (1)		Average installation interval (days)
		Digital data services	DS0	Fractional T-1	T-1	Fractional T-3	T-3	VGSA	VGSW	DDSA	Fractional T-1	DS1	DS3	LATAs served	POPs with service	Mileage-based	ICB	City-pair specific	Installation	Order	Access coordination	CO connection	Access coordination	CO connection	Local channel	Errored retransmission	Downtime	
Sprint Corp. **(800) 877-2000**	Clearline Digital Data Service	✓								✓		✓		180	178	✓			$0	$0	$223-$276	$157-$237	$28.65	$21.25	Varies	0.04%	0.03%	40
	Clearline Voiceband		✓					✓				✓		189	306	✓			$0	$0	$160	$185	$10.55	$20	Varies	0.04%	0.05%	35
	Clearline Fractional 1.5 (Fractional T-2)			✓				✓		✓		✓		189	326	✓			$0	$0	$186	$279	$22	$62	Varies	0.04%	0.03%	40
	Clearline 1.5 (DS-2)				✓			✓		✓		✓		189	326	✓			$0	$0	$186	$279	$22	$62	Varies	0.04%	0.03%	40
WilTel **(800) 642-2299**	56K bit/sec DDS	✓								✓				121	125	✓			$150	$0	$0	$0	$0	$0	LEC	0.03%	0.03%	34
	DS0		✓					✓						113	128	✓			$150	$0	$25/loop	$0	$0	$0	LEC	0.03%	0.05%	24
	Fractional T-1			✓							✓	✓	✓	113	128	✓			$400	$0	$0	$0	$0	$0	LEC	0.03%	0.03%	39
	DS1				✓							✓	✓	142	174	✓			$400	$0	$50/loop	$0	$0	$0	LEC	0.01%-0.1%	0.02%	39
	Fractional T-3					✓							✓	142	174		✓		$2,000	$0	$0	$0	$0	$0	LEC	0.05%	0.01%	ICB
	DS3						✓						✓	60	68	✓			ICB	$0	$160/loop	$0	$0	$0	LEC	0.05%	0.01%	ICB
World Communications, Inc. **(212) 607-2013**	Domestic Digital Network	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	All	12			✓	$500-$1,500	$0	$0	$0	$0	$0	LEC	(2)	(2)	45

DDSA = Digital data special access
ICB = Individual case basis
LATA = Local access and transport area
LEC = Local exchange carrier
POP = Point of presence
VGSA = Voice grade special access
VGSW = Voice grade switched access

(1) Carriers usually express these figures in terms of uptime (for example, 99.6%).
(2) WorldCom was unable to provide these figures.

SOURCE: TELECHOICE, INC., MONTCLAIR, N.J.

porary bandwidth applications such as videoconferencing.

"There is no firm rule for when to install private lines or switched services," says L. Thomas Walton, president of Walton and Walton Associates, Inc. in Richmond, Va. "Each network organization has different budgets, goals and realities."

> "There is no firm rule for when to install private lines or switched services."
>
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Word of private-line death at the hand of switched services may be premature.

The number of private circuits being used is still increasing. Applications such as imaging and local-area network interconnection are helping to fuel the need for more capacity on private corporate networks.

Pricing in flux

With improved switched service capabilities muting arguments that private lines offer higher quality and greater network management control than public services, pricing is becoming more of a focus for private-line decision makers than ever before.

And, as noted, some private-line prices are rising. Just last October, for example, AT&T increased prices for a 56K/64K bit/sec circuit within its Accunet Spectrum of Digital Services fractional T-1 offering from $248 per month and 32 cents per mile to $261.22 per month and 34 cents per mile. Other carriers did likewise with fractional T-1 and other services. The general trend is for prices to continue inching upward.

Even with these slight price increases, users are still getting a good deal on private lines. A few years ago, monthly DDS prices were such that users could get a full T-1 line for what they were paying for nine or 10 56K bit/sec DDS lines. Today, that crossover point is between four and six DDS lines or 64K bit/sec DS0s.

As an example, The Aries Group/MPSG, a consulting firm in Rockville, Md., says a 700-mile T-1 circuit costs the same as five DS0s of comparable length and a 1,500-mile T-1 circuit costs as much as seven DS0s. These figures include local-access costs.

The firm's figures also show that users can now obtain an interexchange T-3 circuit for the same price as between nine and 10 interexchange T-1s. In 1991, an interexchange T-3 circuit cost the same as between 11 and 12 interexchange T-1s.

Users got a boost in the past few years from new private-line volume discount and term plans, extending the price positioning of private lines relative to other services. Today, those plans remain in effect. Each of the carriers provides volume discount plans that, when combined with term plans, offer users discounts in excess of 50% off monthly rates.

Perceived as the high-cost supplier, AT&T can actually offer service for less than its competitors in some instances. AT&T's Multi-Service Volume Pricing Plan (MSVPP), which allows users to combine several digital private services, provides them with up to 57% off standard month-to-month rates for a five-year, $1 million-per-month commitment.

MCI matches AT&T's MSVPP discounts with its Network Pricing Plan (NPP) and charges lower standard rates across the board.

However, pressure from other services will continue to mount. The carriers are starting to build migration paths into other services, away from private lines. MCI's NPP also includes the switched 56K/64K bit/sec data transmission options of its Virtual Private Data Service.

Moreover, these usage-based services are capped at 20% above the comparable MCI private-line rate, ensuring some degree of rate stability when moving from private networks to public net services.

What has helped private lines is advancements in compression technology that allow users to multiply private-line benefits.

> Pricing is becoming more of a focus for private-line decision makers than ever before.
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Technology now allows users to cram several voice conversations on the same channel, whereas only one conversation per channel was possible before. Some equipment vendors, such as Micom Communications Corp. in Simi Valley, Calif., have demonstrated 4.8K bit/sec compressed voice, effectively allowing a user to have as many as 12 simultaneous voice or facsimile communications on a single 64K bit/sec circuit.

"We saved $25,000 a year," said Roy Brown, director of MIS for Hanes Companies, Inc. in Winston-Salem, N.C. Hanes uses several of the Micom Marathon 5Ks. "They work great. We unpack them, we configure them, and then we forget about them."

Needless to say, the best method of price shopping for private-line services is to get each carrier to provide a bottom line that includes installation, central office connection and all monthly charges based on contract length.

Users looking for service quickly should be aware that many carriers charge more for installing service in a short time frame. If you already have service with a carrier, chances are that the carrier can install new circuits much faster.

Price, however, is not every-

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International private-line services

Carrier	Service	Termination agreements	Service speed								Transmission media									One-stop shopping services				Maximum downtime (1)		Average installation interval (days)
			DDS	DS0	Fractional T-1	Fractional E-1	T-1	E-1	Fractional T-3	T-3	TAT-8	TAT-9	PTAT	HAW-4	TPC-3	NPC	HJK	GPT	Other	Ordering	Provisioning	Billing	Net management	Errored retransmission	Downtime	
AT&T (800) 448-8600	International Accunet Digital Services	26 countries	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0.7%	0.7%	ICB
Cable & Wireless Communications, Inc. (800) 969-9998	International Private Lines	Canada	✓	✓	✓		✓												✓	✓	✓	✓	✓	3%	0.33%	54
Consolidated Network, Inc. (314) 993-9009	International Service	Canada, Mexico	✓	✓			✓																	(2)	(2)	60
MCI Communications Corp. (800) 888-0800	Global Private Network Services	90 countries	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	Varies	Varies	60
Metromedia Communications Corp. (201) 804-6400	Private Line	Canada	✓	✓			✓																	0.04%	0.04%	30
SP Telecom (415) 905-4000	SP Telecom International Private Line Service	Canada, Guam, Japan, Phillipines	✓	✓	✓		✓									✓			✓	✓	✓	✓	✓	Varies	Varies	25
Sprint Corp. (800) 877-2000	International Clearline	20 countries	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Varies	Varies	60
World Communications, Inc. (212) 607-2013	International Private Line Service	28 countries	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Varies	Varies	60

DDS = Digital data service
GPT = Guam-Phillipines-Taiwan cable
HAW-4 = Hawaii-4 cable
HJK = Hong Kong-Japan-Korea cable
NPC = North Pacific Cable
PTAT = Private Trans-Atlantic Telecommunications cable
TAT-8 = Trans-Atlantic Telecommunications-8 cable
TAT-9 = Trans-Atlantic Telecommunications-9 cable

(1) Service performance figures are not guaranteed on overseas private-line services. Carriers usually express these figures in terms of uptime (for example, 99.6%).
(2) Consolidated Network was unable to provide these figures.

SOURCE: TELECHOICE, INC., MONTCLAIR, N.J.

Pricing competition heats up international private-line market

Much of the activity in private-line networking is in the international arena, as large users expand overseas or link with partners there. Communications managers buying international private lines face almost the same concerns as those buying domestic lines, except the quality and availability of switched options are not there yet.

The international private-line market is segmented similarly to the domestic market, with T-3, fractional T-3 and T-1 at the high end, fractional T-1 in the mid-range and 56K bit/sec and slower speeds at the low end. However, international T-3 and fractional T-3 services are scarce and expensive right now.

But one major difference arises. International private lines are provided by half-circuit, a theoretical midpoint on a line where U.S. carrier ownership ends and foreign carrier ownership begins. When pricing international private lines, users must get pricing for both halves.

Users expanding overseas are also seeing growing price competition when looking for a hub to centralize and distribute their private-line traffic in a specific area ("Market flux forces users to rethink int'l hub sites," *NW*, March 9).

Hubbing obviates the need to establish point-to-point links from the U.S. to each overseas site, which is an advantage because few users have enough traffic going to one spot to justify a dedicated circuit.

Foreign PTTs are trimming prices in an effort to lure users into selecting their country as a hub. Therefore, users with sites in different countries should have the PTTs in each price out an entire network. It may be beneficial to have multiple hubs, especially where there are significant price advantages.

For example, it may be less expensive to hub from Country A to Countries X and Y, while it is less expensive to hub from Country B to Countries A and Z. In this case, the user could set up hubs in Countries A and B. In addition to cutting costs, such triangulation helps build route diversity.

It may also be advantageous to hub an international net in the U.S. Caterpillar, Inc. in Peoria, Ill., hubs most of its international traffic in the U.S. to take advantage of its central U.S. location that makes it roughly equidistant to Europe and the Pacific Rim.

Pricing competition for hubs is a big change in the international leased-line market. Previously, cost was not a primary criterion. A user needing a private line to Germany, for example, bought one from Deutsche Bundespost (DBP) Telekom and paid the high going price.

Now things are a bit different. While there is still little competition within most foreign countries, there is growing competition between countries as they vie to provide hubs. Prices have dropped dramatically during the past few years — an average of about 50% to 60%. European carriers expect to be lowering prices even further during the next three years.

Despite pricing breaks garnered from hub competition, prices for international private lines are relatively higher than U.S. prices. For example, in the U.S., a user with six 64K bit/sec DS0 circuits can spend the same amount of money on a single T-1 line and gain 18 more DS0s. Overseas, the equation is different. With Belgacom in Belgium, for instance, the crossover point from 64K bit/sec circuits, which cost about $2,100 a month, to a T-1 costing about $21,600 a month is between 10 and 11 64K bit/sec circuits.

After considering price, users need to examine the features of international circuits. One feature that may be more important in international services than in domestic is redundancy. While users can get redundant links across the ocean by using different undersea cables, it is more difficult to get redundant links in the overseas carrier's network. Users should also know in advance how long it will take for installation, which is generally three months in Europe for 64K to 128K bit/sec lines and six months for higher speeds.

To address this, some carriers have started preprovisioned service in which lines are already installed and ready for service between major cities, leaving users to find the nearest access point. MCI Communications Corp.'s Commax service, for instance, provides preprovisioned circuits between the U.S. and the U.K. or Japan. Other countries are due to provide them soon.

This leads nicely into the need to buy all overseas circuits from a single carrier, so-called one-stop shopping. Currently, most one-stop shopping arrangements are limited to providing a single point of contact for ordering and billing. These are based on bilateral agreements among PTTs, and users need to understand which PTTs work together.

There has been considerable effort lately to take one-stop shopping to the next logical level — designing, ordering and managing the net for the customer.

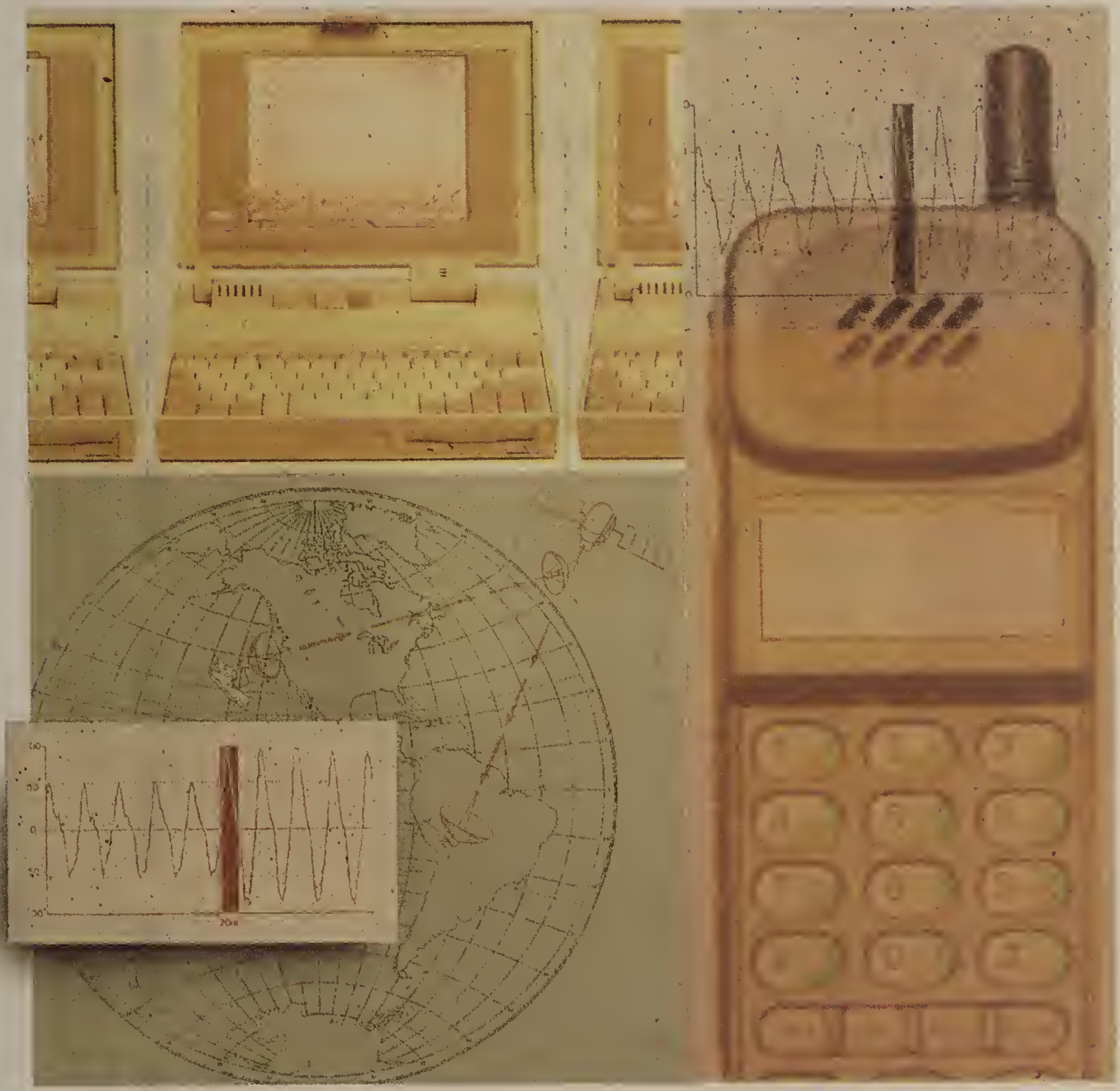
To date, there have been several carrier coalitions to move into this arena — BT's Syncordia Corp., with potential partner Nippon Telegraph and Telephone Corp.; the PTT Netherlands- and Swedish Telecom-led Unisource; DBP Telekom- and France Telecom-led Eunetcom, as well as several initiatives by AT&T, MCI and others. Most carriers seem to be divided as to whether they should join one of the emerging alliances or go it alone. Many are planning for both courses.

In the end, international private lines are easier than domestic services to evaluate and buy in some instances simply because there are fewer alternative services. But as with domestic services, the trend is toward migrating users from private lines to public networking, or at least toward greater participation by third parties in the design, installation and maintenance of international private nets.

— *Daniel Briere*

Mixed signals from wireless communications

By LYNNE GREGG



Back in the 1800s, the equivalent of a network manager for the Apache, Sioux and Iroquois Indians didn't have to contend with data delivery options such as radio-based cellular nets or satellites.

When American Indians wanted to communicate over great distances, all they needed was a little smoke and a few animal hides.

But the network manager of today has an ever-growing choice of wireless network service options, each with its own benefits and inherent limitations that need to be considered.

The advent of cellular networks and radio-based data services, as well as improvements in satellite equipment and services, is enabling corporate net managers to explore new vistas that enable computing professionals to roam free yet maintain links with messaging systems and corporate databases.

The key to maintaining contact with the home office or other sites over wireless nets is knowing which technology is best suited for specific business needs.

Data over cellular

Unofficially, many cellular carriers admit users pass data over their nets, although they maintain that they have no way of determining the extent of this traffic.

Cellular carriers such as Centel Corp., McCaw Cellular Communications, Inc. and US West Cellular say their networks are not yet capable of supporting data traffic.

Robert Mechaley, vice-president of technology development at McCaw, says cellular carriers have "no way of knowing whether data is traveling the network."

All portable computer users need is a laptop with an on-board modem and a cellular phone with a smart interface. They just connect the devices via their RJ-11 ports and dial into CompuServe or another value-added or private network.

As portable computers such as Apple Computer, Inc.'s Macintosh PowerBook hit the streets, more users are clipping these notebook computers to their cellular phones and engaging in a wide range of data and facsimile applications.

Aaron Rosenbaum, a network engineer with Gamma Consulting in Alexandria, Va., receives faxes on his PowerBook via cellular nets. The portable computer has the capability to "wake up" to an incoming call. Once the fax is received, Rosenbaum can modify it and retransmit it across the cellular net.

"I don't have to be stuck at my desk in order to keep in touch with clients and prospects," Rosenbaum says. "I think my setup gives us a glimpse of what mobile computing will be like in a few years. What will change is the ease of use."

Many users view this as a value-added capability of their cellular service. And many find it to be very cost-effective if data calls are kept to short durations.

The rule of thumb for wireless transmission is that radio-based data nets are the least-cost alternative for sending short-duration bursty traffic. Users sending large amounts of data may be better off using a cellular service (see Figure 1, page 54).

Although cellular networks may be more costly to use than radio nets, they impose far fewer restrictions on the types of applications they support. Radio networks, such as those provided by ARDIS Co. and RAM Mobile Data, Inc., are designed to support only data traffic. If users need to establish a voice call while also sending data, they must do so over a

(continued on page 54)

Net managers stand to gain from examining the benefits and shortcomings of emerging wireless service options.

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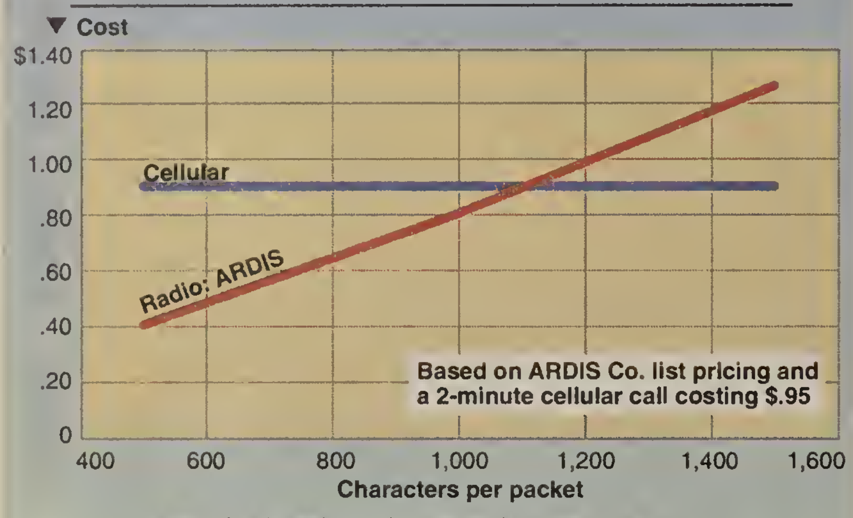
(continued from page 51)

separate network. The benefit of sending data over a cellular net is that the user can establish voice calls over the same net.

Radio and cellular data-transfer costs

Figure 1



For applications involving large data packets, cellular networks are more economical than radio nets.

GRAPHIC BY SUSAN SLATER

SOURCE: LYNNE GREGG, ISSAQUAH, WASH.

Data transmission over cellular networks is typically performed at 2,400 bit/sec, which makes them ideal for sending and retrieving short bursts of data such as electronic mail. However, cellular nets can also support substantially larger files or interactive database requests.

Most users establish routines that optimize their access and data communications, working to keep airtime charges to a minimum. They dial up, log on to the network, upload and download data and hang up quickly.

In the metropolitan Seattle area, for instance, a three-minute call using terrestrial lines at 2,400 bit/sec to access and retrieve E-mail is less than the cost of a copy of *The Wall Street Journal*. Using either US West's or McCaw's cellular services for a comparable call costs a bit more.

The key to cost-effective use of cellular data communications is planning and executing data calls expeditiously. For example, connect charges mount quickly if you let a connection stand too long for an E-mail application.

Due to recent developments, users may soon be able to employ cellular services for a wealth of data applications. In April, nine cellular carriers, including some regional Bell holding companies and McCaw, pledged to support Celluplan II, IBM's cellular packet-handling technology ("Cellular nets to use IBM plan for data," *NW*, April 27).

Celluplan II will enable cellular carriers to shoehorn data into existing voice channels without adversely affecting voice calls (see Figure 2, this page). Several cellular carriers will begin trialing Celluplan II this summer and may have services supporting the technology available to users by the beginning of next year.

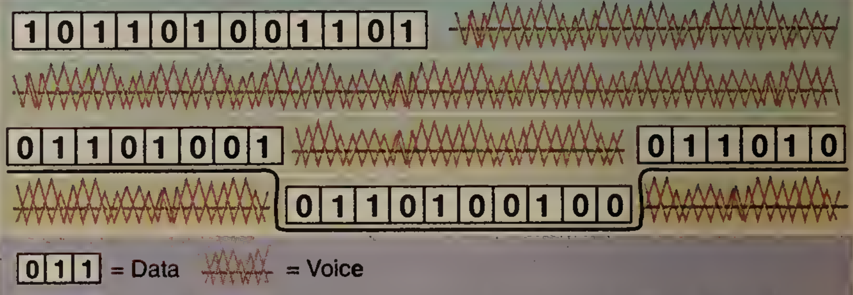
As a result of Celluplan II, cellular carriers will be able to offer value-added data services to their subscribers. Users who have already ventured into the world of cellular data communications should expect to see costs decline. With Celluplan II, carriers will support packetized data at rates up to 19.2K bit/sec.

More importantly, by supporting packetized voice and data, cellular carriers will continue to have a monthly access fee but will be able to bill for data in subminute increments to accommodate data traffic.

Phone jack hunters

Data over cellular networks

Figure 2



Data travels the existing cellular voice network, finding idle time slots amid the voice traffic and hopping channels if necessary.

SOURCE: LYNNE GREGG, ISSAQUAH, WASH.

Sears Communications Co., along with Sears Technology Services, Inc. — serving business units Allstate Insurance Co., Dean Witter Financial Services, Inc. and Coldwell Banker Real Estate Group, Inc., among others — have agreed to participate in a trial of Celluplan II during the next few months.

Sears Communications operates one of the world's largest IBM Systems Network Architecture networks.

Greg Gapinski, a market and development manager at Sears Communications, says a number of the company's clients will be testing the waters of cellular data networking this summer.

During the test, existing 3270 applications will be made accessible to mobile users. According to Gapinski, the test will target "phone jack hunters" — users who constantly search for RJ-11 phone jacks to transmit or access data on the Sears Communications network while traveling.

Gapinski says the objective of the test is to "leverage existing applications against new technology." Future mobile applications might even include wireless point-of-sale transaction processing for field sales representatives.

However, Sears Communications isn't putting all its eggs in the cellular basket. Gapinski notes that the company is also testing data applications on radio networks such as ARDIS and RAM Mobile Data's net. The reason, he says, is that various types of wireless networks run applications differently.

Cellular boasts more flexibility than other wireless options such as radio networks, but not without added cost. However, cellular networks are currently better suited than radio nets to handling large data transfers and interactive data communications.

Cellular networks do not impose restrictions on the length or type of data transmission. Then, of course, there is the added convenience of being able to pick up the handset and make a voice call or check your cellular voice mail for calls that came in while you were accessing your E-mail.

Using a laptop computer with a data/fax modem, you can even send and receive faxes. Citgo Petroleum Corp., for instance, adopted cellular technology on its fleet of delivery vehicles to take advantage of the technology's flexibility, including its ability to handle data and provide voice backup to drivers (see "Citgo goes cellular," this page).

Radio active

While data applications for cellular nets are expected to increase, applications involving the use of radio networks are on the rise as well. No longer are radio networks used for simple one-way paging or two-way courier dispatch operations.

No longer are radio nets used for simple one-way paging.

▲▲▲

In fact, radio net applications are becoming as sophisticated as the networks themselves. A few years back, for example, no one would have thought about running IBM 3270-type applications over a radio network.

ARDIS, based in Lincolnshire, Ill., operates the largest data network in the U.S., interconnecting more than 400 metropolitan areas. The network currently supports data transmission speeds

(continued on page 67)

Citgo goes cellular

When Citgo Petroleum Corp. sought to reduce paperwork and operating costs while increasing the productivity of its delivery drivers last year, the Tulsa, Okla.-based crude oil developer turned to cellular technology.

Citgo purchased a fleet management system from Dallas-based Summary Systems, Inc. that relies on cellular communications provided by almost 50 regional and national carriers, including GTE Mobilnet, McCaw Cellular Communications, Inc. and Southwestern Bell Mobile Systems.

Traditionally, fleet and other dispatch applications have used radio networks. However, cellular's increased flexibility and voice backup in mobile applications have lured many users to the newer technology.

Under the new setup, each Citgo driver is issued a book listing job-related tasks with corresponding bar codes. For example, when drivers begin a shift, they scan the appropriate bar code in their book with a wand attached to their on-board computer. The computer then dials Citgo's dispatch center in Addison, Texas, and notifies one of the Intel Corp. 80386-based personal computers on the local-area network there to download the day's dispatch notices and messages to the drivers' computer. The notices and messages are then printed out on the delivery vehicles' printer.

A dispatcher can check on the status of a vehicle or send a message or additional dispatch notice to a driver by accessing a menu on one of the LAN's PCs. He then selects a specific vehicle from the menu and hits a few keys. The system then automatically dials the vehicle and prints a hard copy report for the driver.

At the end of the shift, the drivers scan a bar code that signals the on-board computers to dial into the dispatch center's LAN. The drivers' on-board computers then upload data such as vehicle mileage, distance between stops and engine-related data, as well as information about the day's deliveries. The data is converted into reports that Citgo can use to establish more direct delivery routes to save fuel.

Although Citgo implemented the system to save time by automating the dispatch function, it has yielded other benefits, as well. For example, the dispatch ticket the driver presents to the customer on delivery serves as a receipt and an invoice. This eliminates the three to four days that were required to print and mail the invoices, as well as the cost of paper and postage.

Because cellular service supports both data and voice communications, Citgo's drivers may initiate or receive voice calls using Motorola, Inc. cellular telephone handsets.

According to David Franklin, Summary's chairman, Citgo drivers collectively make or receive as many as 600 calls daily, averaging 2.3 calls per driver. However, calls are generally limited to 911, dispatch or repair calls.

"Having the cellular phones in the trucks provides the advantage of voice communications in case of a breakdown or emergency," says Ronald Ritchie, manager of systems for service transportation at Citgo.

While Citgo declined to divulge the total cost of the system, Franklin says the average cost is $2,500 to $3,500 per vehicle, depending on features.

During a cost-justification study, Citgo calculated that by automating data collection, the new system would enable drivers to spend about 30 minutes more per shift on the road, rather than at a stop calling the dispatch center. Since each of their 130 trucks operates on two shifts, Citgo calculates a savings of about $40,000 to $50,000 per month. At that rate, the system paid for itself in nine months, according to Franklin.

— *Lynne Gregg*

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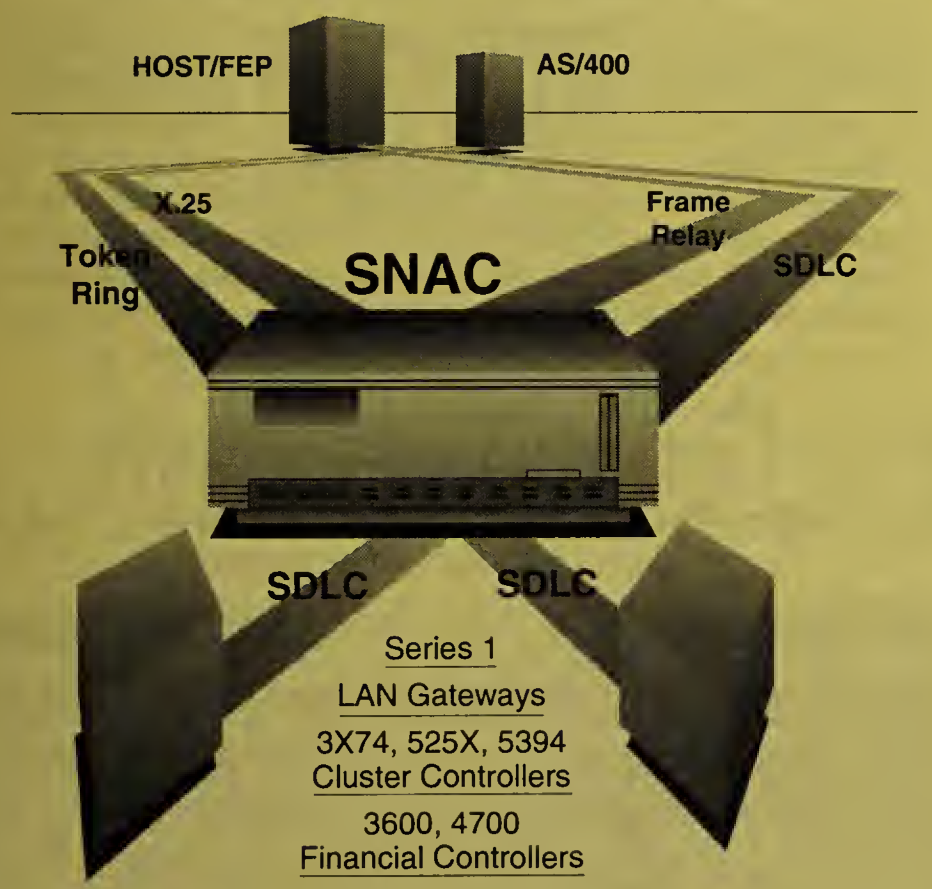

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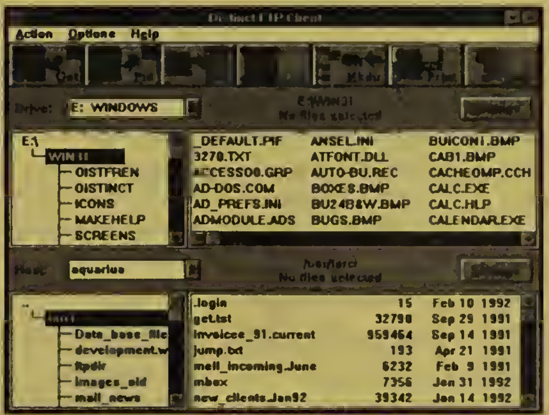

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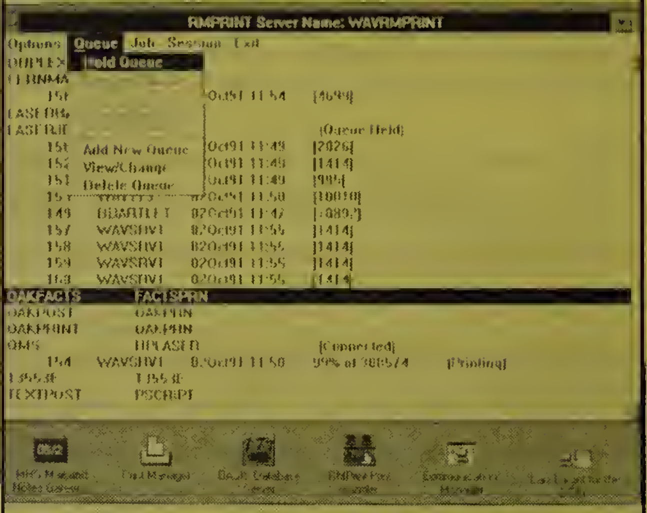

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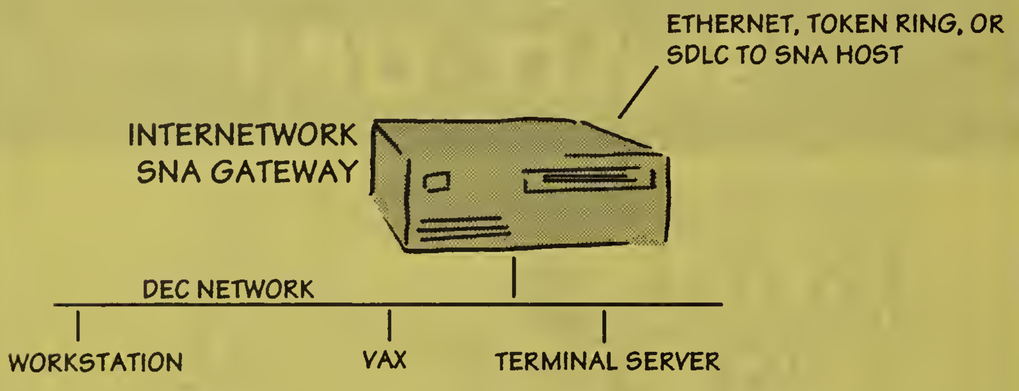

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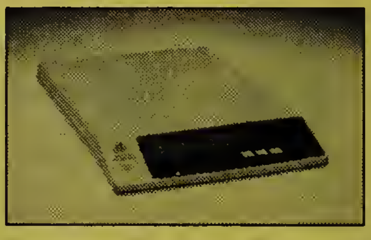

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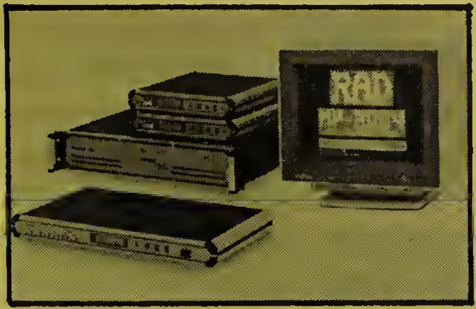

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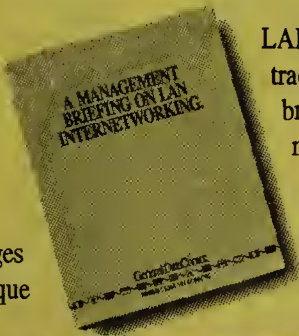

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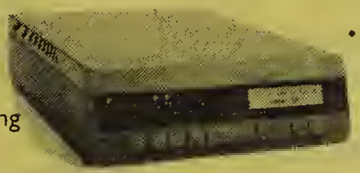

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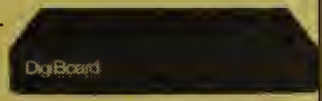

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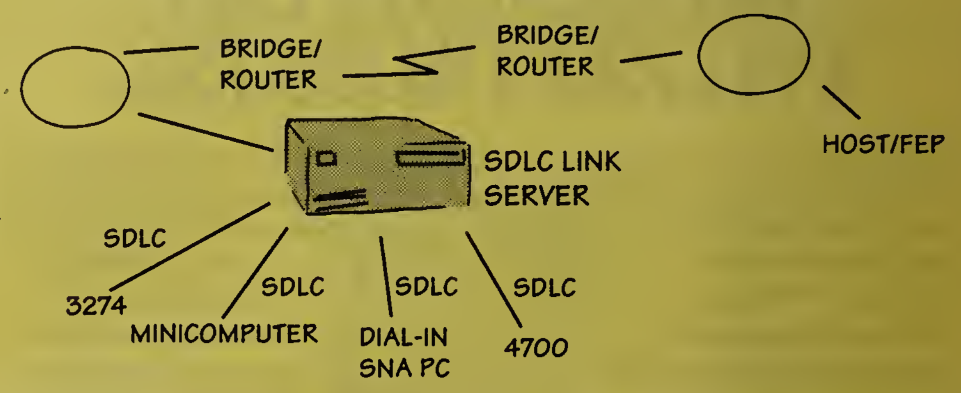

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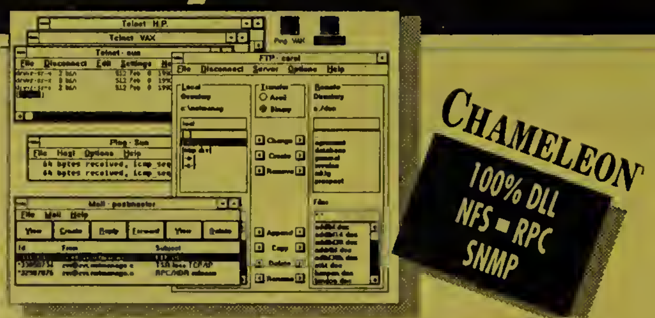

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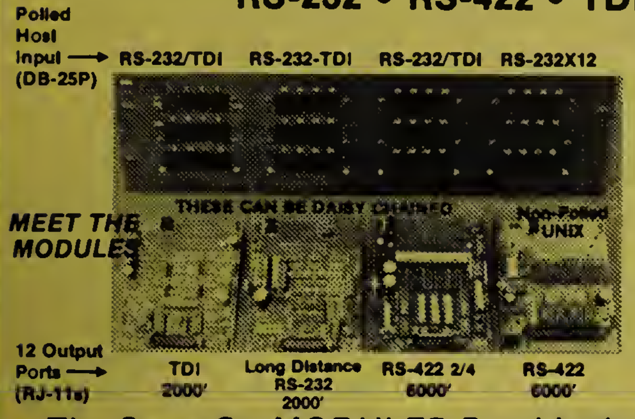

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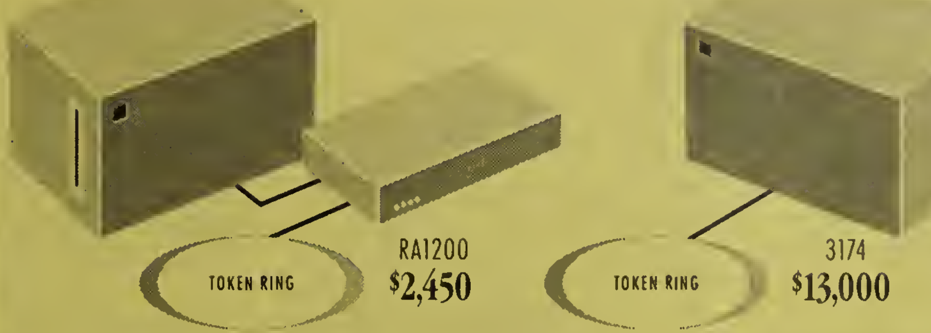

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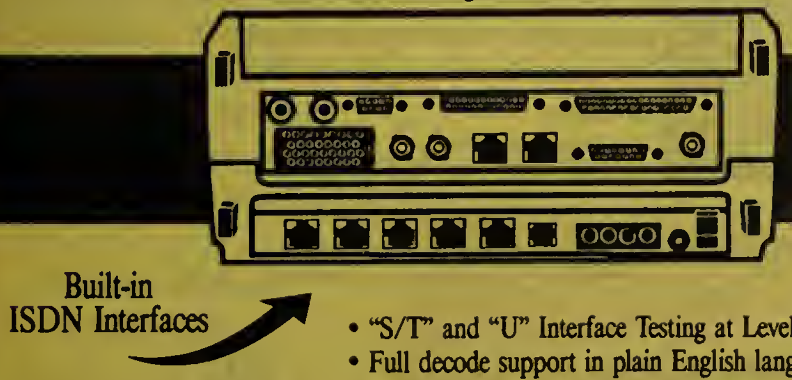

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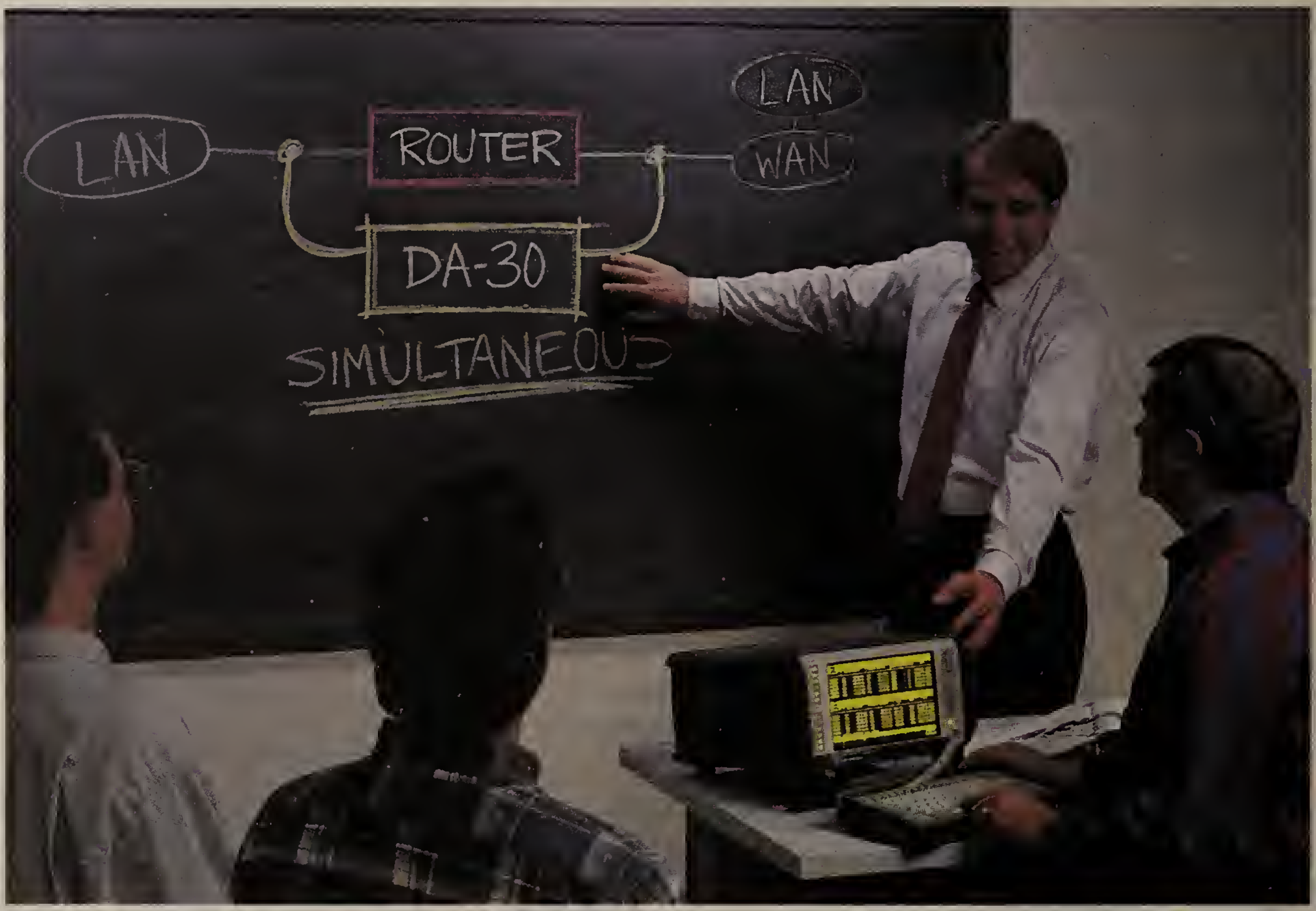

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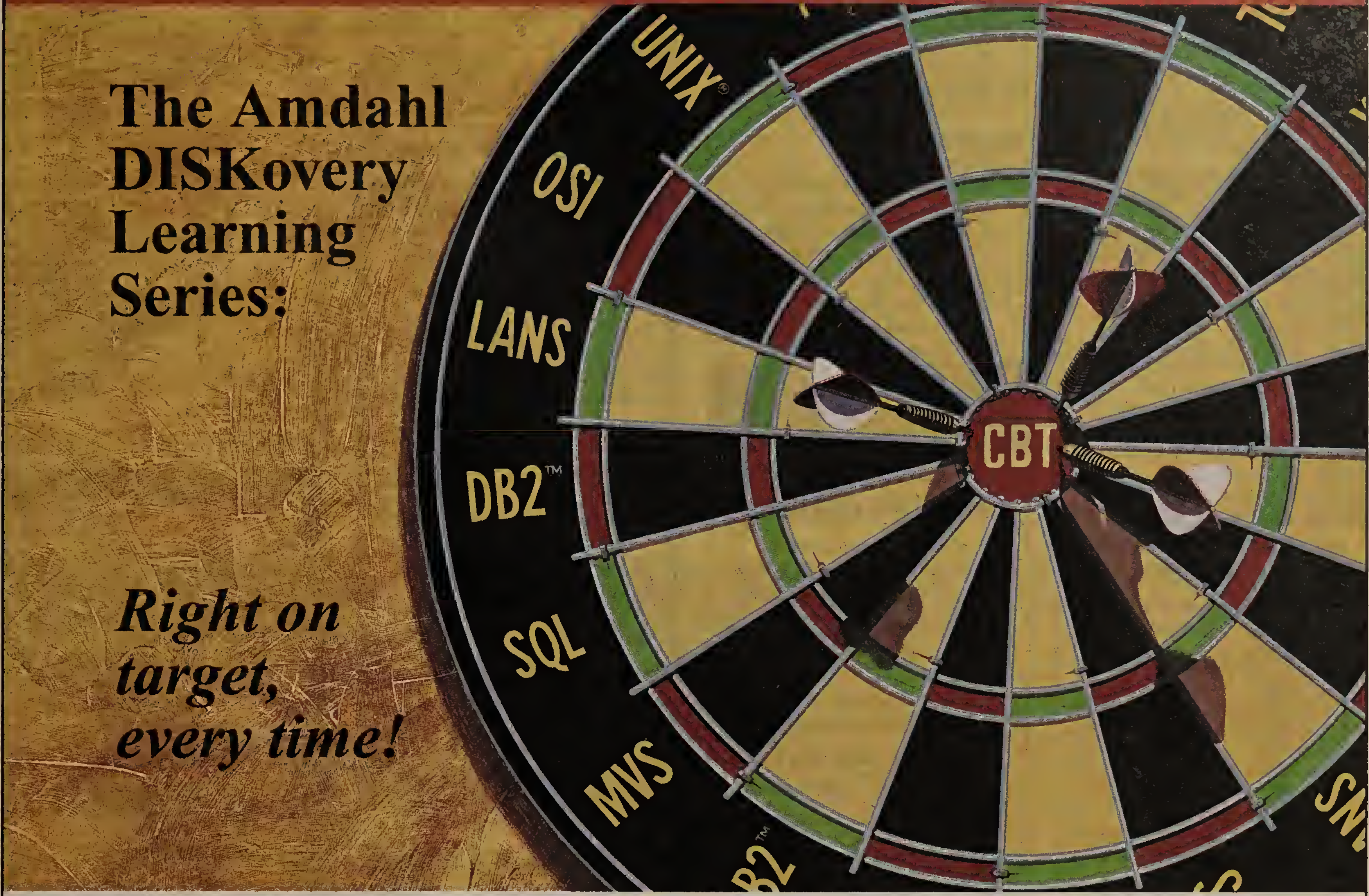

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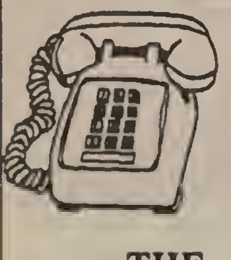

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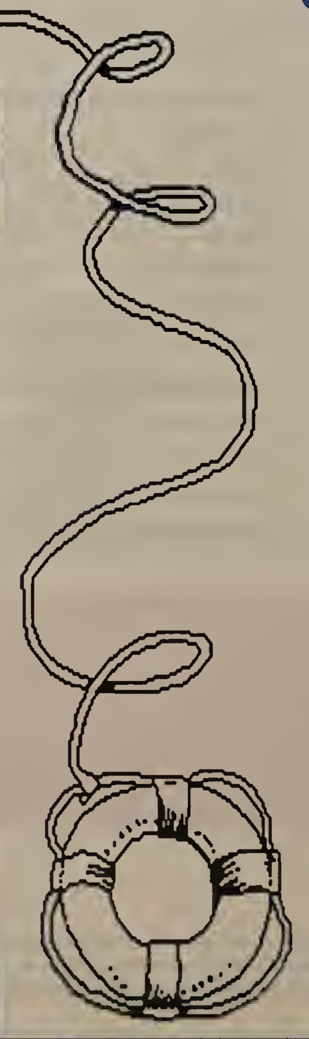

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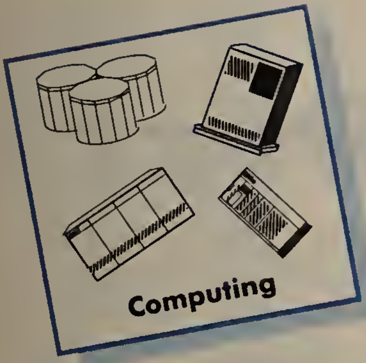

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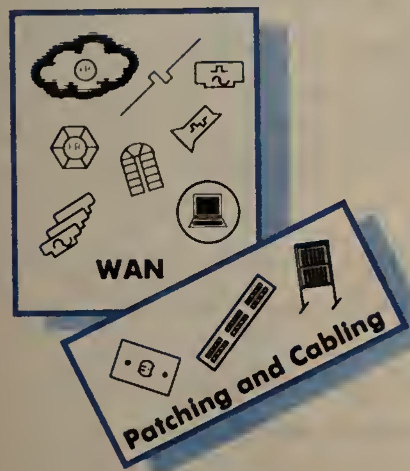

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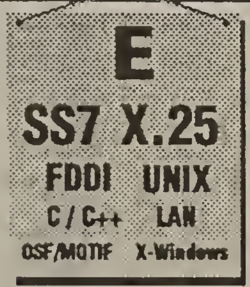

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1. Action requested

1 ☐ Request for sales call
2 ☐ Request for proposal
3 ☐ Request for information

2. Purchase timeframe

4 ☐ Within 60 days
5 ☐ Within six months
6 ☐ Within one year

3. Scope of purchase responsibility

7 ☐ Enterprise wide
8 ☐ Departmental

4. Purchase influence/number of sites

9 ☐ One site
10 ☐ 2-9 sites
11 ☐ 10-20 sites
12 ☐ 21+ sites

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140	141	142	143	144	145
146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175

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101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140	141	142	143	144	145
146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
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Domestic private-line options

Carrier	Telephone	Facility control		Network makeup		DACS	CCR-DACS	M13 multiplexing	M24 multiplexing	M44 multiplexing	CPE provided	Route diversity	Automatic alternate routing	Fiber-only routing
		Percentage owned	Percentage leased	Percentage fiber	Percentage digital microwave									
Advanced Telecommunications Corp.	(800) 741-1992	80	20	90	10	DDS, fractional T-1, DS1, DS3	DDS, DS1, DS3	DS1, DS3	DDS, DS1	DS1	Subrate DDS, DDS, fractional T-1, DS1, DS3	DDS, fractional T-1, DS1, DS3	DDS, fractional T-1, DS1, DS3	DDS, fractional T-1, DS1, DS3
AT&T	(800) 222-0400	100	0	56 (1)	31 (1)	DDS, fractional T-1, DS1	Fractional T-1, DS1	DS1	Fractional T-1, DS1	DS1	None	DDS, fractional T-1, DS1	DS1	DS1, DS3
Cable & Wireless Communications, Inc.	(800) 969-9998	80	20	98	2	Fractional T-1, DS1	None	DS1, DS3	DDS, fractional T-1, DS1	DS1	DDS, fractional T-1, DS1, DS3	DDS, fractional T-1, DS1, DS3	None	DDS, fractional T-1, DS1, DS3
Consolidated Network, Inc.	(314) 993-9009	70	30	88	12	DDS, DS1, DS3	None	DS1, DS3	DS1, DS3	DS1, DS3	DDS, DS1, DS3	DDS, DS1, DS3	None	DDS, DS1, DS3
MCI Communications Corp.	(800) 888-0800	(2)	(2)	75 (3)	25 (3)	DDS, fractional T-1, DS1	DDS, DS1	DS3	DDS, fractional T-1, DS1	None	DDS, DS0, fractional T-1, DS1, fractional T-1, DS3	DDS, DS0, DS1, fractional T-1, DS3	DS1 (ICB)	DS1, DS3
Metromedia Communications Corp.	(201) 804-6400	(2)	(2)	60	40	DDS, DS1, DS3	None	DS1, DS3	DDS, fractional T-1, DS1, DS3	DS1, DS3	DDS, fractional T-1, DS1, DS3	DDS, fractional T-1, DS1, DS3	DS3	DDS, fractional T-1, DS1, DS3
SP Telecom	(415) 905-4000	85	15	95	5	DDS, fractional T-1, DS1, DS3	None	DDS, DS1, DS3	None	DDS, fractional T-1, DS1, DS3	None	DDS, fractional T-1, DS1, DS3	None	DDS, fractional T-1, DS1, DS3
Sprint Corp.	(800) 877-2000	94.1	5.9	100	0	DDS, fractional T-1, DS0, DS1	None	DS1	DS1	None	DDS, fractional T-1, DS1	DDS, fractional T-1, DS1	None	DDS, fractional T-1, DS1, DS3
WilTel	(800) 642-2299	97	3	93	7	DDS, fractional T-1, DS1	None	DDS, fractional T-1, DS1, fractional T-3, DS3	DDS, DS1	None	DDS, fractional T-1, DS1	DDS, fractional T-1, DS1, fractional T-3, DS3	DDS, fractional T-1, DS1, fractional T-3, DS3	DDS, fractional T-1, DS1, fractional T-3, DS3
World Communications, Inc.	(212) 607-2013	0	100	80	15	DDS, DS0, fractional T-1, DS1, fractional T-3, DS3	DDS, fractional T-1, DS1, fractional T-3, DS3	DDS, fractional T-1, DS1, fractional T-3, DS3	DDS, fractional T-1, DS1	DS1	DDS, fractional T-1, DS1, fractional T-3, DS3	DDS, fractional T-1, DS1, fractional T-3, DS3	DDS, fractional T-1, DS1, fractional T-3, DS3	DDS, fractional T-1, DS1, fractional T-3, DS3

CCR = Customer controlled reconfiguration
CPE = Customer premises equipment
DACS = Digital access and cross connect
DDS = Digital data service

(1) Based on route miles.
(2) MCI and Metromedia were unable to provide these figures.
(3) TeleChoice estimate.

SOURCE: TELECHOICE, INC., MONTCLAIR, N.J.

(continued from page 49)

thing in the private-line market. Carriers are scrambling to create differentiations in a rapidly maturing market.

To quote almost any private-line product manager, "digital is digital." Once the bits are in the line, they all look the same. And to a great extent, the figures for the percentage of time a circuit is unavailable and the percentage of data retransmissions that arrive with errors look the same, too.

In fact, there is a 0.07% difference in the circuit availability figures AT&T, MCI, Sprint and WilTel quote for DS0 service. AT&T and MCI report that their services will be down 0.1% of the time, while WilTel says its is only down 0.05%, and Sprint claims its is down 0.03%.

The resulting comparison? Networks that run 24 hours a day, 365 days a year will be without service for about nine hours a year with AT&T or MCI, about 4½ hours with WilTel and a little more than 2½ hours with Sprint. For users that run data over the circuits for only eight hours a day for the approximately 250 business days in the year, the figures narrow down to two hours for AT&T and MCI, one hour for WilTel, and 36 minutes for Sprint.

There is only a 0.02% difference among the carriers in the number of times there are errors in data that was retransmitted in order to correct an error the first time it was sent. AT&T claims there will be errors in retransmitted data 0.01% of the time, while MCI and Sprint claim their rate is 0.04%. WilTel claims a rate of 0.03%.

There are many who would argue that even a few moments of downtime are too expensive or a few extra retransmissions are unacceptable. Those users will be concerned when they learn that these figures are, for the most part, performance objectives, not guarantees.

Even with private and some switched services sharing similar quality, a major reason users have resisted the movement to the public network has been a lack of corresponding control and monitoring capabilities that are readily available with private lines. This is still the case, although management capabilities of virtual networks are rising rapidly to equivalence, if they are not already there.

> To quote almost any private-line product manager, "digital is digital."
>
> ▲▲▲

Network management

While virtual network management has been bolstered, net management capabilities for private lines have not significantly changed during the past year. AT&T still leads the way for monitoring and control capabilities for private-line networks with extensive performance monitoring and superior reconfiguration capabilities. AT&T has recently replaced its Customer-Controlled Reconfiguration system with the Accunet Bandwidth Manager, giving customers a tool that can execute private-line configuration changes within three minutes.

However, MCI has gained ground with the expanded dynamic reconfiguration capabilities in its Digital Reconfiguration Service-Dynamically Allocated Bandwidth (DRS-DAB) system. DRS-DAB gives MCI private-line customers the ability to dynamically allocate digital private-line capacity in response to intermittent applications such as videoconferencing.

Earlier this year, WilTel introduced its WilView network management product for on-line access to its internal management systems, providing trouble tracking as well as circuit inventory for its private-line services. The WilView system has a window to the WilBand bandwidth reservation system and gives customers a constant status report on any outstanding trouble ticket.

Sprint's introduction of Insite Executive does not do much for private-line users, as the initial module deals only with 800 services. Customers can use Insite Executive for trouble-ticket entry and tracking, as well as communications with Sprint's network control centers. Sprint expects to add private-line modules to Insite Executive early next year.

What's in a network?

Network management is but one criterion for selecting private lines. An extremely obvious and often-asked question is: Does the carrier offer digital private-line service where I need it? In the U.S., 99 times out of 100, the answer will be yes.

Another question is: How long must the access line be to get to the nearest point of presence (POP). Here, one should look for carriers with more access points nationwide. On average, the more entry points to a carrier network, the shorter the access link.

So, the next question is: What's in the network? Most carriers in the U.S. today are using close to 100% digital fiber-optic lines to provide private circuits. However, there are exceptions. Some carriers use digital microwave, especially the smaller ones. For instance, Metromedia Communications Corp.'s network is 40% digital microwave,

(continued on page 66)

(continued from page 65)

but even some larger carriers still use it — MCI's network is about 25% digital microwave, while AT&T's net is 31%.

Copper and analog facilities are largely missing from carrier nets, not just for private-line services, but for almost all carrier services. Satellite use is limited largely to international and rural or dispersed applications.

If your private lines are used primarily for data and your network equipment is sensitive to transmission interruptions, noise and fades, you may want to ask your carrier for guarantees that your circuits will be routed over fiber and not microwave. AT&T, for instance, offers customers a fiber-only routing option for an additional $631 onetime charge.

> "Users are crazy if they are not using DACS as an integral part of their network."
>
> ▲▲▲

Next, find out if redundant, diverse circuits are available and, if so, how those circuits can be routed. Some carriers rent capacity on circuits owned by other carriers, so even though you are using multiple carriers, you might not have diversity.

Diversity guarantees

WilTel is the only carrier whose network design center is capable of showing users on a segment basis not only the routing of WilTel facilities, but also if those WilTel circuits are carrying traffic from other carriers.

AT&T offers its Enhanced Diversity Routing Option, which guarantees customers electronical and physical route diversity.

Also, ask for diverse routing from different local POPs or local telephone company central offices into your office sites. Most local carriers offer diverse access through separate central offices with digital access and cross-connect system-based (DACS) reconfiguration options.

There are clear benefits for using DACS in disaster recovery and alternative routing, but there are still questions as to whether the local exchange carrier or interexchange carrier is better at providing them. Local exchange carrier DACS equipment is more geared to intra-local access and transport area use.

Customer-controlled reconfiguration functions allow users to electronically reconfigure DS0 channels using customer premises equipment terminals. This basically gives users access to their carriers' DACS whenever they want it.

"Users are crazy if they are not using DACS as an integral part of their networks," says C. Woody Randall, vice-president of Nations Bank in Columbia, S.C.

In addition to DACS options, carriers also offer different forms of multiplexing options for leased lines. These services are typically little more than channel bank services, providing simple circuit connectivity.

Carriers offer DACS and multiplexing options on circuits operating at various speeds, as shown in the private-line options chart on page 65. For the most part, if one carrier offers DACS or multiplexing options for a certain speed, others do, too.

The future

This similarity in options is further proof that private lines are somewhat of a commodity today. But users are likely going to deal with more factors than ever before in the years to come.

> "It's hard to imagine a networking arena without private lines."
>
> ▲▲▲

It's obvious that in the future, there will be increased use of high-bandwidth services, including fractional T-3 and T-3 private-line circuits, as users roll out high-bandwidth applications.

However, what role will switched high-bandwidth services, such as frame relay and SMDS, play in the future? Both switched services will carry traffic that historically would have traveled over private lines.

One thing that will keep the decision simple in the near term is that frame relay and SMDS are not really developed to the point where wholesale desertions from private networking is occurring. Moreover, advances in technologies such as voice compression will keep private lines viable for some time to come.

"It's hard to imagine a networking arena without private lines," Walton says. "I think users will always have such lines in their nets well into the next century."

Briere is president of TeleChoice, Inc., a Montclair, N.J., consultancy specializing in strategic planning and analysis of intelligent networks, services and applications. He can be reached at (201) 746-0200.

HEY, WAKE UP in THERE!!!
Z Z Z Z Z Z Z

Mixed signals from wireless

continued from page 54

up to 4.8K bit/sec, but ARDIS plans to increase that rate to 19.2K bit/sec by year end.

With ARDIS, users employ a radio modem attached to their portable microcomputer or other device for interfacing with ARDIS radio base stations in cities where the service is offered. Subscribers broadcast data to the base stations, which in turn provide access via gateways to the IBM Information Network (IIN), Sprint Corp.'s SprintNet and other value-added networks.

ARDIS, a joint venture of IBM and Motorola, Inc., is used extensively by both companies' field representatives. Using portable IBM PCradios, IBM field service engineers can access the IIN to perform remote diagnostics on customer systems — often times averting site visits — check inventory, and receive and update service call notices.

ARDIS' main competitors in the radio network arena are RAM Mobile Data of New York and Racotek, Inc. of Bloomington, Minn. RAM Mobile Data is a joint venture of BellSouth Enterprises, Inc. and RAM Broadcasting Corp.

The RAM Mobile Data Network currently covers 30 cities and supports data transmission up to 8K bit/sec, which the carrier maintains is faster than ARDISNET's best speed.

Racotek has developed a net that "overlays existing trunked radio nets used for voice communications," says Mark Gobel, a reseller manager at Racotek.

The Federal Communications Commission has allocated a much broader range of radio frequencies to voice communications, and Racotek's network, RacoNet, allows data traffic to ride over the voice nets operating in more than 1,000 U.S. locations. This presents another option for firms considering the use of radio networks for data applications but requiring limited voice communications, as well. (See Figure 3 on this page for a feature comparison of the ARDIS, RAM and Racotek networks.)

While ARDIS uses a proprietary protocol to transmit data, RAM's Mobitex protocol is based on the International Standards Organization's Open Systems Interconnection model. Users need specialized modems to access either of these radio networks.

Radio-based nets do have some inherent limitations users should consider. They support smaller packet sizes than cellular nets, and users can only transmit data, not voice traffic.

Radio applications

Several alliances between computer equipment manufacturers and radio network carriers are beginning to make waves in the radio net sector.

Radio network comparison

Figure 3

Feature	ARDIS Co.	Racotek, Inc.	RAM Mobile Data, Inc.
Coverage	400+ metropolitan areas	400+ metropolitan areas	50 metropolitan areas
Transmission types supported	Data	Voice, data	Data
Mobile and in-building	Both	Mobile	Both
Channels supported	Varies	Up to 450	10 to 30 in each metropolitan area

GRAPHIC BY SUSAN SLATER

SOURCE: *NETWORK WORLD*

Hewlett-Packard Co. and other providers of so-called palmtop computers are forming partnerships with radio net service providers to offer enhanced messaging applications that are a step above traditional paging services. Many of these new services are designed for short bursty types of applications, such as messages of 300 characters or less.

HP has teamed with RAM Mobile Data and Ericsson GE Mobile Data, Inc. to support data transfer over RAM's network. The HP 950LX palmtop computer can be used with Motorola's NewsStream radio receiver and Skytel Corp.'s network to support enhanced messaging applications.

The combination of HP, Ericsson GE Mobile Data and RAM Mobile Data can also be used with Anterior Technology's Two-WayRadioMail gateway software to give users access to the Internet, CompuServe or private nets.

Ericsson GE Mobile Data's Mobidem contains enough memory to collect 16 inbound messages, each a maximum of 512 bytes, while a local-area network-attached personal computer is idle.

Palmtop users can transfer a message to a LAN-attached workstation and access a calendar program at the workstation to check schedules and make changes.

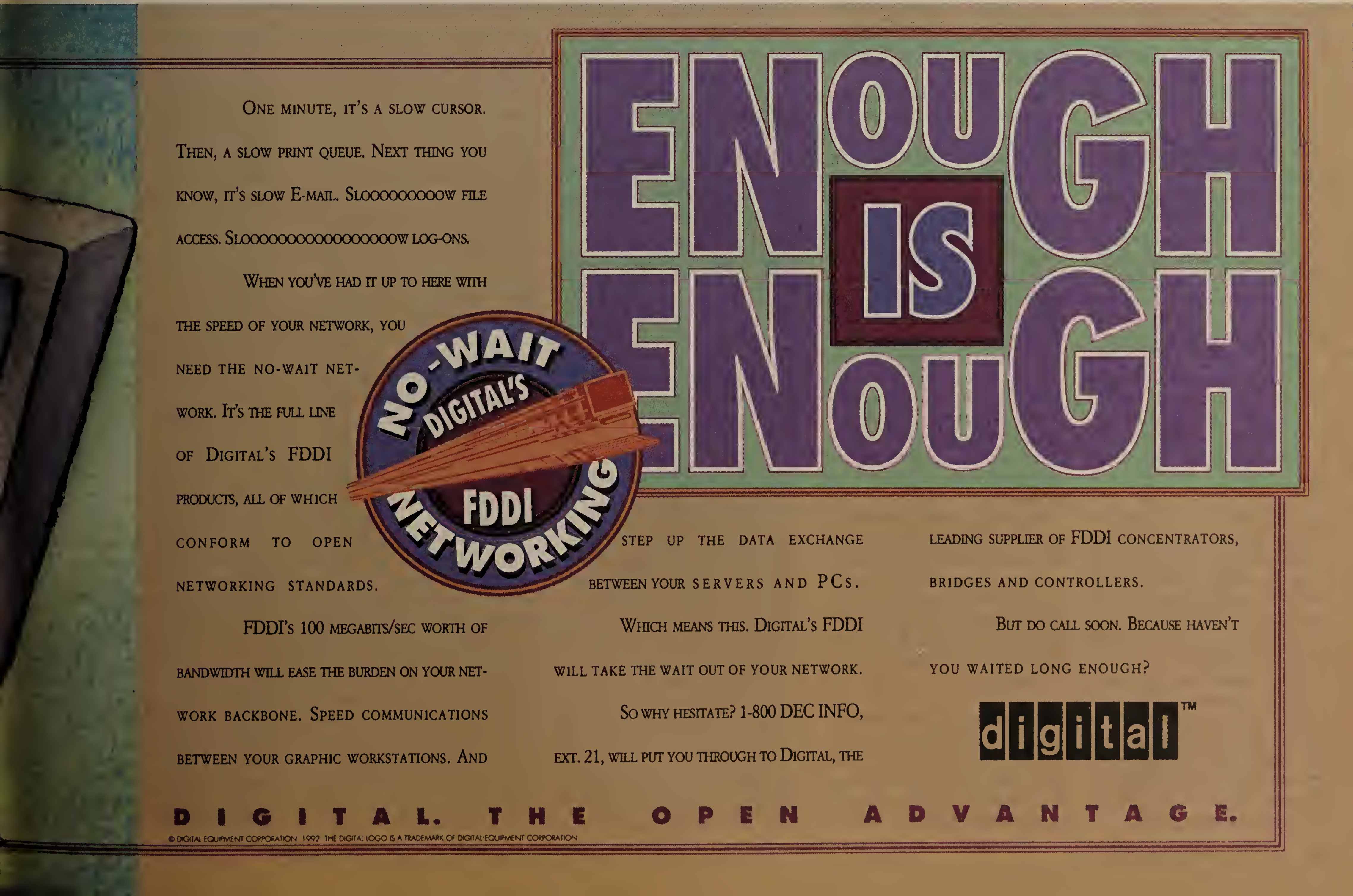
Another application for use with radio nets is Simware, Inc.'s SplitSecond RF. Simware is better known as a microcomputer-to-mainframe software provider.

The Ottawa company's SplitSecond RF supports IBM 3270 communications over RAM Mobile Data's radio network. Used on DOS-based notebook PCs, the software provides access to E-mail and other mainframe applications, even as users rove between radio cells. The company is also now working with ARDIS to offer its users 3270 connectivity.

SplitSecond RF strips extraneous screen display data from transmissions. Screen layouts are stored on the PC, and modifications are made based on control information that SplitSecond RF ships across the line with the data.

"This cooperative processing

(continued on page 68)



One minute, it's a slow cursor. Then, a slow print queue. Next thing you know, it's slow E-mail. Sloooooooooow file access. Slooooooooooooooooooow log-ons.

When you've had it up to here with the speed of your network, you need the No-Wait Network. It's the full line of Digital's FDDI products, all of which conform to open networking standards.

FDDI's 100 megabits/sec worth of bandwidth will ease the burden on your network backbone. Speed communications between your graphic workstations. And step up the data exchange between your servers and PCs.

Which means this. Digital's FDDI will take the wait out of your network.

So why hesitate? 1-800 DEC INFO, ext. 21, will put you through to Digital, the leading supplier of FDDI concentrators, bridges and controllers.

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(continued from page 67)

can take what might ordinarily be a 2,000-character transmission and turn it into a mere 20 [characters],'' says Alison Overtveld, a spokeswoman for Simware.

Although some modification is necessary to optimize radio access to host applications, the software is still a cost-effective means of getting at corporate databases from the road.

Priced at $495, SplitSecond RF for the PC includes communications software, a Mobitex driver and a SplitSecond RF 3270 host module application program interface. Simware has marketing partnerships with RAM Mobile Data, Ericsson GE Mobile Data and other carriers.

Hybrid wireless nets

In addition to cellular and radio nets, a new type of hybrid wireless net is in the early stages of evolution. Personal communications networks (PCN) employ microcell designs like larger cellular nets but service a much smaller coverage area.

While cellular networks pass calls over large metropolitan regions, PCNs will initially be limited to cells of a few hundred feet in dimension. However, they will eventually offer the ability to pass data onto regional and national nets.

At this stage, PCNs are being deployed to handle voice traffic only, though some 150 companies have applied to the FCC for PCN licenses to support data, too.

Last year, for instance, Apple submitted a request to the FCC for allocation of radio spectrum for data communications applications.

Apple's proposal, Data PCS (personal communications service), calls for the unlicensed use of designated radio frequencies by anyone who is capable of tapping them. The intent is to spur development of wireless data communications applications.

Similar to the voice PCNs available now, Data PCSs would offer wireless communications within an area of about 160 feet.

Apple's Data PCS request, however, is still pending FCC approval.

Satellite stir

Until recently, satellites have been the primary option for users wishing to install wireless networks. But the emergence of public network-based cellular and radio services may limit demand for private satellite nets.

That's not to say private satellite networks won't have their niche. Users looking for secure transmission environments will find private satellite nets their best wireless option. Currently, satellite nets are used to transmit video, voice and even data.

One trend in the private satellite services market is for equipment makers to offer very small aperture terminals that cost less than traditional equipment and thus lower the initial capital investment for a private satellite network.

Users should expect to see a steady stream of VSATs that measure less than 1 meter in diameter and support T-1 rates. Also, low-cost 6-in. VSATs are now being used by some transportation companies.

Leave it to LEOs

The advent of low-earth orbit (LEO) satellites will hasten delivery of voice and data to hand-held devices for cellular-based nets.

These LEO networks will serve as satellite backbone nets to link cellular and radio-based nets.

For that reason, many cellular players have made significant investments in satellite nets. For example, McCaw is a major investor in American Mobile Satellite Corp. (AMSC). AMSC is planning to launch a satellite network in 1994, as is Iridium, an affiliate of Motorola. With Iridium, Motorola plans to deploy 77 LEOs.

Nonetheless, AMSC is aggressively seeking customers today and serving them by leasing space on Communications Satellite Corp.'s COMSAT satellite net. COMSAT is also launching a Ku-based service, possibly this year, that will allow users to transmit data to Europe and South America via small low-cost VSATs.

Many of these early satellite applications target users' data transfers to and from unattended devices that may monitor climactic conditions or be used to relay data to and from marine or cruise ship operators and airlines.

Untethered computing

The emergence of reliable cellular and radio-based nets may profoundly change the landscape of business computing. No longer will users be chained to their desks by copper or fiber cables.

Recognizing the tremendous market opportunity, new companies are popping up and beckoning users with a wealth of wireless communications products and services.

But before users cut the cord that connects them to their LANs, they need to consider the ramifications of these new wireless services and make sure they select the one that is best suited for their applications. Otherwise, their net connections may just go up in smoke. ◻

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Revolution in the air

Wireless options shaking up the voice system market.

There's a revolution brewing in the staid private branch exchange and Centrex markets — one that is likely to provide users with greater flexibility in the way they communicate.

A slew of vendors, including start-ups and traditional PBX vendors, are prepping wireless key systems or PBX adjuncts that are expected to improve worker productivity, enhance customer service and, ultimately, reduce telecommunications costs by minimizing telephone tag and eliminating wiring changes.

Although the first wireless PBX products began shipping last month, the market is already being challenged by cellular carriers that are testing scaled-down cellular systems for inside buildings or enclosed public areas, such as train stations or malls.

"Wireless will be a key technology for us in the future," says Richard Bretagne, chief information officer at Northwestern Memorial Hospital in Chicago. "When doctors and nurses get beeped on their pagers, they have to search for a phone. It's more efficient if they just answer the call."

System makeup

Most wireless systems are adjuncts to PBX or Centrex services, or they are stand-alone wireless key systems that can double as a wireless PBX or Centrex adjunct. These systems generally consist of a controller unit that is linked via an analog line to a PBX or Centrex system, multiple base stations or transceivers that are scattered throughout a site, and small, portable handsets.

The controller is linked via a two-wire telephone line to base stations, which are typically the size of smoke detectors. Handsets automatically register with the nearest base station and support digital voice broadcasts.

According to Peter Bernstein, senior analyst at Probe Research, Inc., a market research firm in Cedar Knolls, N.J., the market for wireless voice systems will grow to $7 billion by 1996. His confidence in the future of wireless voice systems stems partly from firsthand experience. Probe Research is currently serving as a beta-test site for a wireless key system developed by a vendor Bernstein would not disclose.

When evaluating whether to purchase a wireless PBX, the most basic decision users make is whether to wait for the Federal Communications Commission to allocate spectrum for wireless in-building communications. The FCC must allocate spectrum for certain usages before it can license users to operate radio systems in those frequencies.

Several small vendors, namely Rose Communications, Inc., Omnipoint Corp. and SpectraLink Corp., are betting it will take the FCC a long time to allocate spectrum. Last month, all three announced wireless PBX or key systems that do not require an FCC license.

The risk in using unlicensed products is that they can be shut down by the FCC if they are shown to be interfering with licensed communications systems, according to Ira Brodsky, president of Datacomm Research Corp. in Wilmette, Ill.

John Lozier, vice-president of marketing for Northern Telecom, Inc., says he expects the FCC by mid-1993 to allocate spectrum somewhere in the 1.8-GHz to 1.9-GHz range for in-building communications.

Wireless PBX systems employ a variety of mechanisms for divvying up radio spectrum and providing support for simultaneous two-way communications. Frequency Division Multiple Access (FDMA) assigns calls to specific frequencies or channels within the allocated spectrum. Time Division Multiple Access (TDMA) assigns calls to multiple, specific time slots within frequencies and Code Division Multiple Access (CDMA) encodes each call with a unique signal that is spread over a range of frequencies, a technique known as spread spectrum.

Generally, FDMA systems are easy to implement but require more base stations and consume more power than others. TDMA systems provide better handoffs between base stations as users roam within a building but are subject to timing problems between base stations and radio controllers. CDMA systems are more secure, offer higher capacity and are less prone to interference, but they can be more complex to set up than other systems.

Currently, most wireless PBX adjuncts are expected to cost more than double that of traditional PBXs, according to Allan Sulkin, president of TEQConsult Group, a consulting firm in Hackensack, N.J. The steep price tag may initially dissuade many users from considering the systems.

But Sulkin says competition has already lowered prices. Last year, wireless PBX systems were projected to cost an average of $1,000 per user vs. $800 today.

Some users may not wait until desktop and wireless system prices are comparable. "We might consider buying a wireless PBX once per-line costs drop to the point where they are only 50% greater than that of traditional phone systems," says John Crankshaw, manager of telecommunications at Steelcase, Inc. in Grand Rapids, Mich.

Alternatives in the offing

To complicate the evaluation, users need to decide whether microcellular systems offer capabilities that are more in line with their requirements. The microcellular systems offer users the potential of having a single portable handset to make or receive calls at home or work, while walking outside or driving.

In contrast, wireless PBX systems currently limit mobility because each base station can only operate in a radius ranging from 125 to 500 feet, Bernstein says.

Bell Atlantic Corp. this fall will begin a live nine-month customer trial of a microcellular system in Pittsburgh. Microcells are low-powered cell sites that cover a much smaller physical area than macrocells, which may cover several miles and are used in typical cellular networks.

Motorola, Inc. will provide lightweight, portable handsets for the test. The handsets automatically register with the nearest microcell or macrocell base station.

Southwestern Bell Corp. is beta-testing a microcellular system that it expects to ship by the end of the year.

Wireless voice communications systems pose new challenges to network managers, but they also offer new opportunities to improve service and the quality of communications within and between companies. To keep abreast of this rapidly emerging technology class, net managers need to keep a close watch on developments at the FCC, as well as the prices of available products and the versatility of radio technology deployed by vendors.

— Wayne Eckerson

Is OSI dead?

continued from page 1

NETWORK WORLD'S
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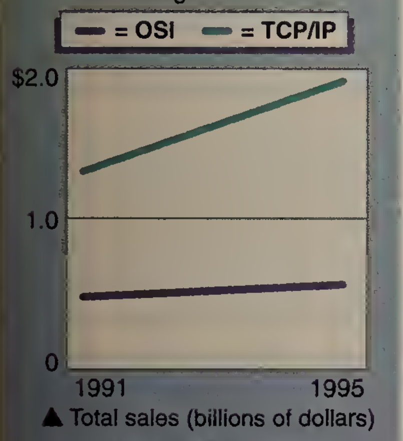
Launched in the late 1970s with much fanfare, OSI was supposed to bridge the islands of proprietary network and computer systems within companies and usher in a new era of open systems computing.

But OSI standards have taken longer than expected to develop, and OSI products didn't hit the market until the late 1980s, leaving many users disenchanted and seeking alternatives.

"Two years ago, we were gung ho about OSI, but the products never materialized," says one network manager at a major pharmaceutical firm who requested anonymity. "Now we are trying to decide whether to go with TCP/IP or wait for OSI."

OSI and TCP/IP user expenditure
Figure 2



Figures are based on 1991 projections of worldwide sales of TCP/IP and OSI hardware and software products.

SOURCE: INFONETICS RESEARCH, INC., SAN JOSE, CALIF.

Market research shows that most users have already made the decision and opted to implement TCP/IP at the short-term expense of OSI.

Infonetics Research, Inc. in San Jose, Calif., projected in 1988 that vendors would sell $1 billion of OSI products annually by 1991. But in 1991, actual sales of OSI products were only $470 million, while TCP/IP sales climbed to $1.3 billion in the same period. Infonetics now projects that sales of TCP/IP products will grow to $1.9 billion annually by 1995, while sales of OSI products will remain flat (see Figure 2, this page).

The lackluster performance of OSI and the popularity of TCP/IP caught many vendors by surprise. IBM, for example, initially saw TCP/IP as a tactical stepping-stone to OSI that would disappear as users migrated to pure OSI, according to Alan Reinhold, IBM's product administrator for TCP/IP and OSI in Raleigh, N.C.

"In 1988, we thought TCP/IP would fade into the sunset as users migrated to pure OSI nets," he says. "We were wrong."

In response to market demand, IBM, like many other vendors, has during the past year doubled the amount of resources committed to TCP/IP development while paring down OSI development, Reinhold says.

Others, however, believe OSI will simply vanish.

"People are using TCP/IP and improving on it, while few people are using OSI, and no one is improving it," said Kanwal Rekhi, executive vice-president of Novell, Inc.'s interoperability systems group. "My sense is OSI will fade away."

OSI advocates counter that the only reason users aren't buying OSI is because vendors charge too much for the products. In contrast, many vendors bundle the core TCP/IP protocol stack into products at no extra charge.

"Vendors are willing to write off the development of TCP/IP technology against their entire product line," says Michael Kaminski, manager of computer-integrated manufacturing at General Motors Corp. Most are not willing to do this for OSI, he adds.

A *Network World* survey of 100 companies that spend an average of $6 million annually on net equipment and services shows that networks are still predominately proprietary today, but use of TCP/IP and OSI is growing.

Users project TCP/IP traffic will grow to comprise 36% of network traffic by 1994 but then begin to dip as OSI popularity surges. By the year 2002, users anticipate that the protocol mix on their networks will be 50% OSI, 28% TCP/IP and 22% proprietary protocols.

Most users surveyed (66%) say they view TCP/IP as a stepping-stone to OSI (see Figure 3, page 69). But a near-equal majority (60%) also say TCP/IP is an adequate alternative to OSI.

E.I. du Pont de Nemours & Co., for example, has made a long-term commitment to OSI but is currently installing TCP/IP to replace proprietary systems where possible.

"TCP/IP is a stepping-stone to OSI because it allows us to build a multiplatform network to support our company's move to distributed computing," says Jim White, manager of network interoperability at du Pont.

White admitted that it will be more costly to make two migrations — one to TCP/IP and the next to OSI. But he says, "While OSI applications are extremely valuable to us, we can't continue to wait until all the requisite parts get here." Specifically, White is awaiting OSI products for transaction processing and remote procedure calls.

Sudhi Umarji, a product manager at McLean, Va., systems integration firm HFSI, thinks OSI will go through the same long ramp-up to market acceptance as TCP/IP and will explode onto the market in five to eight years.

"No one thought 15 years ago that TCP/IP would be the big seller it is today," Umarji says. "Sales of TCP/IP were initially driven by the federal government, but as products grew in number and matured, the commercial sector woke up and realized their value. The same thing will happen with OSI."

But not all observers are so sanguine about OSI's prospects.

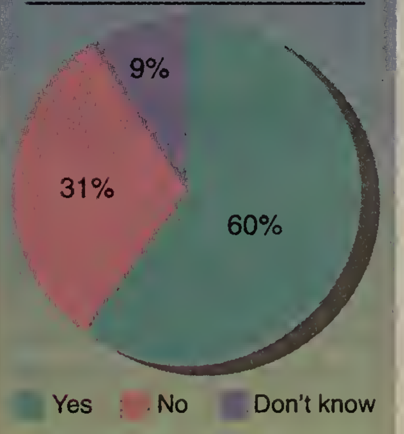
Marshall Rose, a consultant and author who is one of the most knowledgeable but harshest critics of OSI, says, "Is OSI dead? Of course it's dead. It's been dead for a couple of years. It's just that the effort is so big and has so much lumbering momentum behind it that people haven't figured out the process is bereft."

OSI beachheads

Notwithstanding its critics, there is evidence that OSI is making gradual progress on many fronts. For example:

- About a dozen router vendors have added support to their products for the newly approved OSI routing protocol, called Intermediate Systems to Intermediate System (IS-IS).

Do you view TCP/IP as a stepping-stone to OSI?
Figure 3

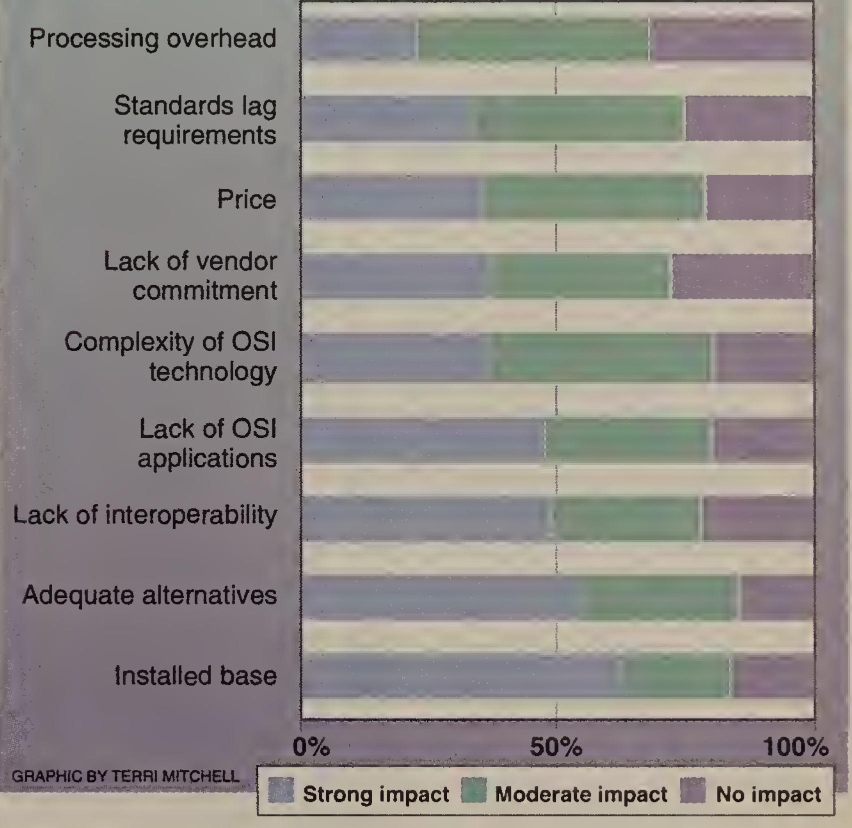


GRAPHIC BY TERRI MITCHELL

Richard desJardiens, education director of the GOSIP Institute in Silver Spring, Md., says IS-IS is the missing link that will allow users to finally set up end-to-end OSI internetworks.

- The federal government has mandated use of products that conform to the Government OSI Profile (GOSIP). Many observers say this mandate alone may be enough to guarantee that OSI will grow well into the future.
- A number of vendors have announced they will release electronic messaging products based on the 1988 OSI X.400 standard, which provides improved security and long-awaited messaging and directory features ("New crop of feature-rich X.400 products emerging," *NW,* March 23).
- An OSI X.500 pilot on the Internet started by Performance Systems International, Inc. in 1989 now involves 1,200 organizations in 27 countries and provides users access to more than 400,000 white page entries.

Rating obstacles to OSI acceptance
Figure 4



GRAPHIC BY TERRI MITCHELL

- OSINET Corp., a nonprofit group that keeps record of OSI interoperability tests, says 14 vendors have registered 53 OSI products that interoperate in pairwise tests. Thirty-two of the registered products support OSI's File Transfer, Access and Management (FTAM), and the rest support X.400.
- The Internet Activities Board (IAB), which oversees the Internet, is considering using OSI's internetwork protocol — called the Connectionless Network Protocol — to replace IP, which has limited addressing space. It has also begun examining how to incorporate OSI's X.500 as a directory service on the Internet.

Lyman Chapin, IAB's chairman and chief net architect for BBN Communications Corp., says he wants to end the protocol wars that have traditionally pitted TCP/IP against OSI. He says the Internet is evolving to become an inherently multiprotocol network that will adopt parts of OSI.

While OSI is making progress, there are still many obstacles to be overcome. The biggest stumbling block mentioned by *Network World* readers was the difficulty of migrating proprietary systems to OSI (see Figure 4, this page).

Users also mentioned the availability of adequate alternatives and the lack of available OSI products, as well as the high cost, complexity and lack of interoperability of these products.

Rose says OSI's problems are a result of a flawed process used to develop the standards. The people involved with OSI standard development spend most of their time writing standards, not implementing the technology to see if the standards actually work. "The end technology is bloated, inconsistent and just not good stuff," Rose says.

Options can be a hindrance

Some OSI protocols are loaded with 200 or more options that suboptimize network and application performance and makes it virtually impossible that any two vendor implementations will interoperate, according to Rose.

He adds that the slow pace of OSI standards development has given the Internet community time to enhance TCP/IP to contain much of the functionality scheduled for OSI. This has made TCP/IP an attractive alternative.

The best example is the Multipurpose Internet Mail Extensions (MIME), which enhance the Simple Mail Transport Protocol (SMTP) to support multimedia messaging. MIME was recently approved as an Internet standard, and already there are three openly available implementations and a dozen vendors planning to support it, Rose says. The 1988 version of X.400, by comparison, supports multimedia

(continued on page 70)

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messaging, but no products are available.

"It's hard to find things in OSI that are supposed to provide superior functionality that actually deliver it," Rose says.

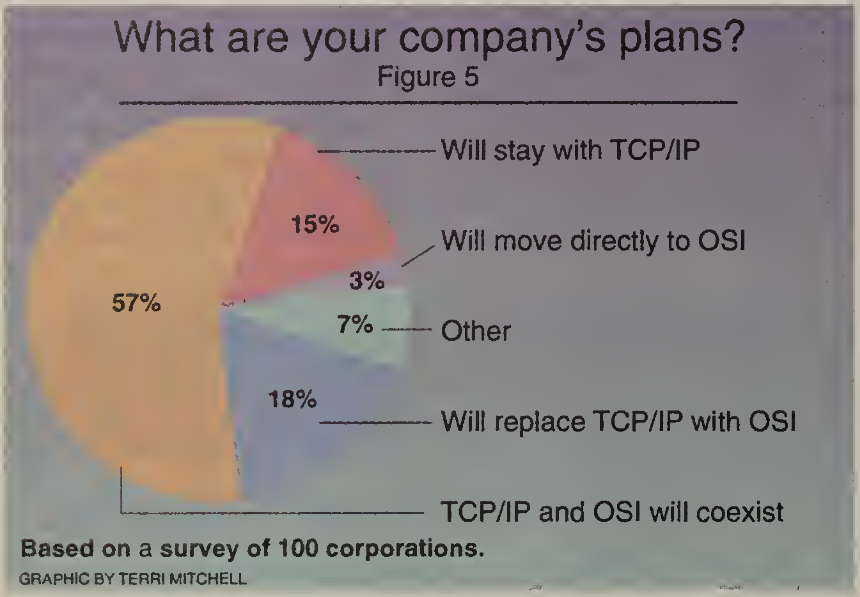
What are your company's plans?

Figure 5

Based on a survey of 100 corporations.

GRAPHIC BY TERRI MITCHELL

Some users are beginning to wonder whether the enhancements OSI offers are worth the wait. "TCP/IP and SMTP give me 80% of what I need," says Charlie Snell, network manager at Harris Corp. in Melbourne, Fla. "I don't know whether it's worth investing in OSI for the remaining 20% functionality."

While OSI advocates acknowledge that TCP/IP is gaining momentum, most argue that OSI will eventually catch up. "OSI is on a long ramp," desJardiens of the GOSIP Institute says. "When you compare each OSI standard with its counterpart in the IP world, in every case, the OSI standard is richer and more functional. Unfortunately that means OSI implementations will be larger and more complex and costly. It will take the next 10 years for the industry to build up an OSI infrastructure that makes it easy and convenient to implement [OSI]."

A new look

Recognizing that TCP/IP is gaining acceptance daily and that users are growing impatient with OSI, OSI developers are proposing changes. In an effort to reduce the complexity and OSI overhead, developers recently proposed a slimmed down version of the seven-layer OSI stack that would make it easier for users to migrate from TCP/IP to OSI. The OSI skinny stack specifies a narrow subset of the session, presentation and application layers that can run on top of TCP or OSI transport layers.

Theoretically, applications written to TCP/IP using common transport application program interfaces would also be able to run over OSI transport layers.

The Internet community has also developed hybrid protocols that let users run OSI applications over TCP/IP. Rose, for instance, helped develop the International Standards Organization Development Environment, which lets users run FTAM, Virtual Terminal and X.400 applications over TCP/IP. Also, there is a net management protocol that allows users to run Common Management Information Protocol (CMIP) over TCP/IP (called CMOT).

OSI advocates admit OSI will have to share the spotlight with other protocols and that some OSI protocols will just fade away. "There are obviously some parts of OSI that won't make it," desJardiens says. "Let the market decide which parts are good and which aren't."

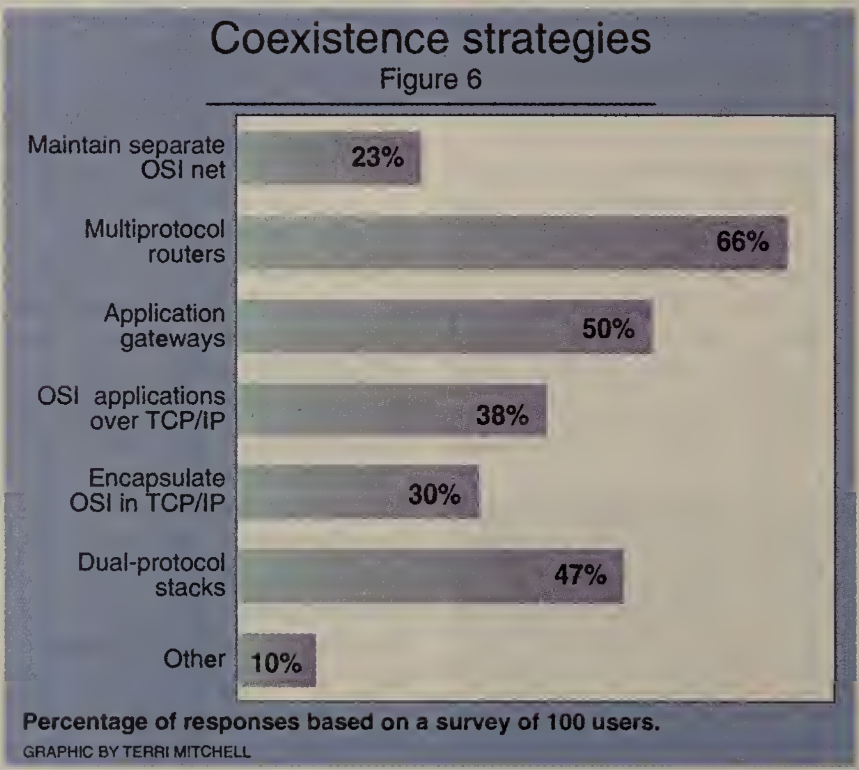
Coexistence strategies

Figure 6

Percentage of responses based on a survey of 100 users.

GRAPHIC BY TERRI MITCHELL

He adds that the future success of OSI depends on whether the Internet community takes in and modifies parts of OSI and helps build an OSI infrastructure. "Ultimately, the Internet is going to have to make OSI work," he says.

Ed Albrigo, strategy director at the Corporation for Open Systems International, an open systems consortium of vendors and users, says, "It's a multiprotocol world, and we need to learn how to approach OSI when TCP/IP is taking off because it is" (see Figure 5, this page).

As a reflection of the growth of TCP/IP, COS in January joined the Internet Society, which oversees TCP/IP development, Albrigo says.

The upshot is that coexistence has become a way of life.

Most users say they are buying TCP/IP today to solve their immediate network problems while planning to migrate some traffic to OSI as the standards mature and products become available. Users say proprietary, TCP/IP and OSI protocols will coexist on their networks for years to come.

To support the coexistence of multiple network protocols, net managers are adopting a variety of strategies (see Figure 6, this page).

The most popular — listed by two-thirds (66%) of the users responding to *Network World's* survey — is to use multiprotocol routers. These routers enable users to run OSI and TCP/IP protocols across the same physical network, eliminating the need to establish separate networks.

In addition to multiprotocol routers, nearly half of those surveyed say they will implement OSI-TCP/IP application gateways and dual OSI-TCP/IP protocol stacks, and a third say they plan to run OSI applications over TCP/IP or encapsulate OSI within TCP/IP packets (see Figure 7, this page).

The U.S. Army, for example, recently outlined plans to install 4,700 interconnected LANs that will support both TCP/IP and OSI protocols using dual-protocol stacks ("Army reveals its plans for nationwide LAN internet," *NW,* Jan. 27). Dual-protocol stacks on network workstations will enable users to access either OSI or TCP/IP services, insulating users from having to decide which transport services are required by different applications.

The Johnson Space Center within the National Aeronautics and Space Administration, on the other hand, considered implementing dual-protocol stacks on every workstation but dismissed the idea because it would cost too much, says Jan Cox, network planning manager at the center.

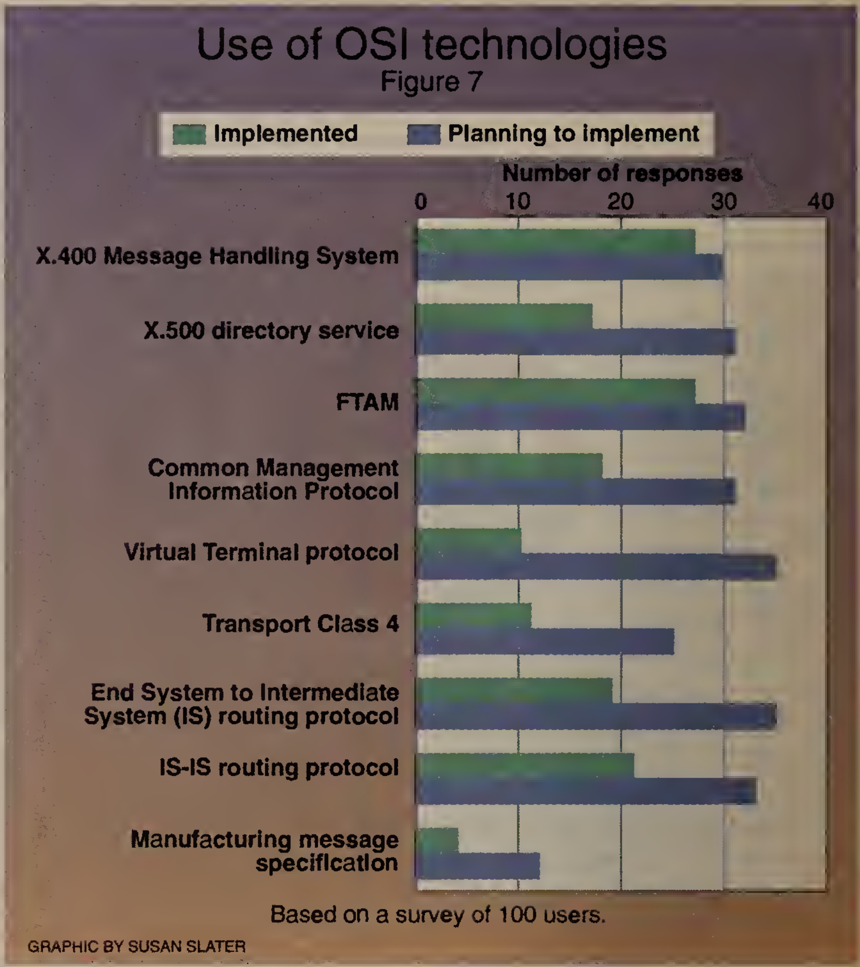
Use of OSI technologies

Figure 7

Based on a survey of 100 users.

GRAPHIC BY SUSAN SLATER

While some users have balked at implementing dual-protocol stacks, several big systems vendors — namely IBM, Digital Equipment Corp., 3Com Corp., Groupe Bull SA — are wedded to the concept. DEC, for example, recently outlined a network architecture that supports multiple protocol "towers" within applications. DEC's architecture — as well as those from the other three firms — will enable users to transparently access TCP/IP or OSI applications from a single workstation.

Future directions

While OSI won't live up to its original promise, it's clear that OSI will be one option that corporate America will use to try to achieve interoperability in multivendor environments.

Clearly, it is time for the industry to wake up to the fact that no single network standard will prevail, but even two standards are better than proprietary network approaches.

Vendors need to put aside their proprietary interests and assign their best and brightest developers to work on developing TCP/IP and OSI in the near term, as well methodologies to seamlessly integrate the environments in the long term.

In addition, there needs to be meaningful cooperation between the OSI and TCP/IP camps. Each group must put aside the dogmatism that has separated them in the past and work to incorporate the best that the other camp has to offer. Hopefully, we have already begun to see the beginnings of that cooperation.

For users, it is important to unite and send a clear signal to vendors and the leading open systems groups about the kinds of products needed. Instead of waiting to see which way the wind blows, users must recognize that they determine the kinds of products that will be available in the future.

Is OSI dead? No. But the utopian vision of a omnipotent elixir that can solve all networking woes has passed on. ◼

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NETWORK WORLD'S

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READER ADVOCACY FORCE

OSF scraps plans for data engine

continued from page 2

jects that continuously poll devices in a net to monitor and control their operation and performance. IBM's data engine might, for example, hold a router object that could define performance parameters as well as instructions for accessing the router.

Tivoli's object server, dubbed Object Dispatcher, holds objects that are best suited for short-lived, task-oriented operations, such as adding or subtracting a user from the network. OSF will now enhance the Object Dispatcher to assume the monitoring and control functions of the IBM data engine.

The elimination of the data engine "was a business decision to reduce the complexity" of molding DME, said Kathryn DeNitto, OSF DME technology manager.

Dick Knowles, manager of network management alliances at IBM, said his firm is disappointed that the data engine will not be implemented in DME's initial release but the decision is understandable. He added that IBM will "do everything to influence data engine's inclusion" in subsequent DME releases.

Separately, OSF, as planned, is incorporating technology from the Object Management Group (OMG) into DME to make it compliant with object-oriented computing standards. OMG is a Framingham, Mass., think tank on object-oriented technology.

OSF said support for the OMG technology was not a factor in the decision to hold off on the data engine.

"When we came out in the fall, [OMG technology] was not yet public," DeNitto said. "But it came to a point where we needed to support relevant standards."

OMG technology will replace or augment components of DME contributed by a handful of vendors. One such component is an application program interface (API) from Tivoli that ties applications to DME management request brokers. A broker locates objects on behalf of management applications.

"To achieve as object-oriented an approach as possible was always part of the plan" with DME, said James Herman, a principal at Northeast Consulting Resources, Inc. in Boston. "Users are going to have their investments better protected because they won't have to change to comply with OMG."

OSF will release to developers DME's distributed services, such as software licensing and distribution, print services and event handling, by the middle of next year. By the end of 1993, OSF will release the DME framework, which includes the user interface, management objects and developer's tool kit.

Unix Int'l unveils net mgmt. plan

PARSIPPANY, N.J. — Unix International, Inc. (UI) last week said it has completed its list of requirements for a distributed systems and network management environment.

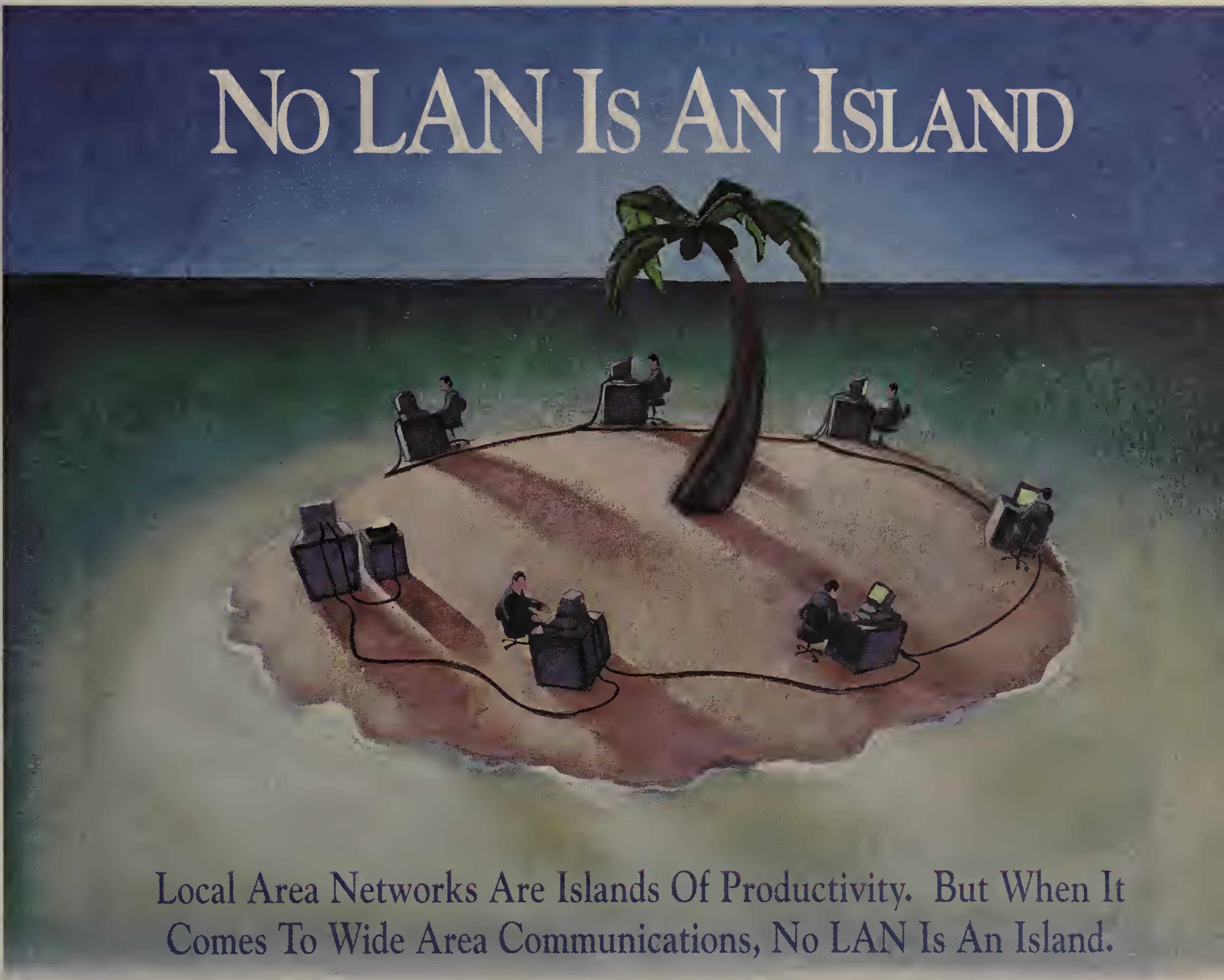
The UI framework will be built on object-oriented technology and support applications for net management, print service and management, and data backup, archival and restoral.

UI's object-oriented underpinnings will be supplied by Tivoli Systems, Inc., while the applications will be supplied by other vendors, including NetLabs, Inc. for network management and Siemens Nixdorf Information Systems, Inc. for print services.

Tivoli also contributed technology to the Open Software Foundation, Inc. (OSF) for the management request broker and object server components of OSF's Distributed Management Environment. The common Tivoli components will allow the UI and OSF management systems to interoperate.

UI will release its framework in the first quarter of next year, while OSF will release its framework in December 1993.

— Jim Duffy



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Windows gets closer ties to TCP/IP world

continued from page 1

time to develop applications," said Alistair Banks, manager of connectivity relations for Microsoft's developer relations division.

For users, the API will free them from being tied to any one of the approximately 20 varieties of Windows TCP/IP when they buy a terminal emulator, database access program or other application that depends on TCP/IP to move information, said Bob Waterman, product line manager at Novell's San Jose, Calif.-based Interoperability Systems Division.

It is also possible the API will spur vendors to build new TCP/IP applications and port their Unix applications to Windows, Banks said.

Most vendors that have Windows TCP/IP applications have committed to support WinSock in their next major release. For example, SunSelect, Inc., a Sun Microsystems, Inc. company, will offer WinSock support for its PC-NFS management tools when it upgrades the package sometime next year.

"TCP/IP will open a whole new world for LAN users who are bumping against a glass ceiling of interoperability," said Geoff Arnold, a distinguished engineer with SunSelect.

Microsoft's Banks expects the majority of the first applications using WinSock to let Windows personal computers act as clients to Unix servers, such as database servers. But when Microsoft's own 32-bit, multitasking Windows NT ships, applications makers may use WinSock to communicate between NT servers and clients, or even to let a Unix client access an NT server.

Some members of the Windows Socket Committee are looking at extending the API to other platforms.

"You can do extensions to it, like provide it on another operating system," said Bill Nelson, lead developer of TCP/IP products for DOS at IBM's Research Triangle Park, N.C., facility. "It's reasonable that we'd consider extending it to other platforms like OS/2, but we haven't explored that yet."

"We're talking to [Apple Computer, Inc.] Macintosh players about doing the same thing," said Novell's Waterman. "The Macintosh has the same problem with our [TCP/IP], Apple's MacTCP and InterCon [Systems Corp.'s TCP/IP]."

Originally defined by the University of California at Berkeley for use in its Berkeley Software Distribution Unix, sockets is a programming method for passing information between different software elements through a standard interface. With the growing modularity of software, the sockets method has become an increasingly popular programming technique. ☐

IBM seeks to boost OEM product sales

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Analysts said IBM has already started acting as an OEM for its mainframe channel-attached local-area network gateway, the 3172. AT&T Paradyne will build mainframe channel extenders on top of the 3172.

APPN and 3172 technologies are but two of the newer products NS hopes to push into the OEM market. IBM already has a strong OEM presence in the Token-Ring OEM marketplace with Cisco Systems, Inc., Netronix, Inc., National Semiconductor Corp. and others acting as an OEM for IBM Token-Ring boards.

"IBM's OEM strategy in the past has been to do more research and development for others rather than actually being a marketing channel," said Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J. "But with a leaner, meaner IBM, it sees that the OEM market could open up new sales channels and influence channels for its communications and hardware products."

Nolle said a key area on which IBM will focus its OEM strategy will be the router market. "NS, with its 6611 router, is going to have a hard time battling directly with Cisco or Wellfleet routers," Nolle said. "Letting the 6611 sell through non-IBM channels will help establish the IBM router quicker."

Other analysts agreed, saying NS should move its router into a position to integrate with hub vendors like Wellfleet Communications, Inc. has done with 3Com Corp. and Bytex Corp. Cisco has its router integrated into Cabletron Systems, Inc. hubs.

"There is a lot of opportunity for IBM OEM products in the interconnect market," said Kevin O'Neill, vice-president of research for the Business Research Group, a consultancy based in Newton, Mass. "IBM is trying to break out of its 'We don't do business this way' mode, and how aggressive IBM is will determine how successful it will be." ☐

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NW 1

Roberts to take MCI helm

Bert Roberts, president and chief executive officer of MCI Communications Corp., last week said he expects to succeed William McGowan as chairman of the firm.

Roberts said it is an "odds-on likelihood" that MCI's board of directors will vote him in as chairman when they meet on June 23, a date scheduled before the board received news of McGowan's death.

Until then, Roberts said he will continue to run the firm in his current capacity.

"There is an orderly transition of power taking place here," he said. "When I became CEO, it was clear that McGowan had passed the baton to me to run the company."

Roberts, who is 49, was named president in 1985 and CEO in December of 1991.

McGowan had served largely in an advisory role during the past few months, Roberts said.

One of the last major projects in which McGowan had been personally involved was MCI's expansion in the international marketplace.

The company has launched an international version of its Virtual Network (Vnet) service, in addition to international switched data, private-line and voice services. It is also a part owner — along with several European telecommunications agencies — of Infonet, a value-added provider of international data services.

Roberts said one of the primary challenges he faces in steering MCI into the future without McGowan's watchful eye is to "continue movement into the global arena."

The company must also continue to build its market share, he said, and keep bureaucratic creep from taking over in the $10 billion-per-year firm.

"I must keep this company thinking small, keep the culture that Bill McGowan started and built in this company," Roberts said. "To me, that's key to our success. Many great companies have died from their own weight rather than what's happening in the industry around them."

Among the most pressing regulatory issues Roberts cited were 800 portability and equal access to all carriers — not just AT&T — using 0+ dialing. Additionally, he said, keeping the Modified Final Judgment restrictions in place is essential.

"It's critical for MCI that the Bell operating companies not be allowed into the long distance [market] for the foreseeable future or until they no longer have a monopoly hold over the bottleneck," he said.

— *Anita Taff*

Software links applications

continued from page 6

forms and communications protocols, but Covia Technologies now provides an off-the-shelf solution. "Users can continue to develop applications in their native environments while installing new networks and developing new applications. CI will allow the two environments to communicate," said Paul Zagaesky, a senior analyst with The Yankee Group, a Boston consultancy.

Covia Technologies also announced that IBM, Stratus, Tandem and NCR have all licensed CI for use on their high-end systems and will have products out by the end of the year. IBM has been selling CI since October.

At the low end, CI runs on OS/2, Microsoft Corp. Windows and DOS platforms, while Unix support is expected soon.

IBM is using CI to provide an interface between its Transaction Processing Facility (TPF) Versions 2.2 to 3.1 and its mainframe MVS/SP operating system Version 2.2. TPF is a high-performance mainframe-based transaction processing monitor employed in large data communications systems, such as airline reservation nets.

Previously, if MVS and TPF systems wanted to exchange information, they had to communicate using applications written to the Synchronous Link Control protocol, which analysts said is slow and difficult to use.

"CI has let our users in the travel industry link up their disparate [MVS and TPF] applications without interrupting their existing application bases," said Kathrine Rutledge, an industry manager with IBM.

CI pricing varies depending on the vendor and type of machine on which the software will be running. For example, the license fee for an IBM 3090-600J is $130,000, plus an annual fee of $23,400. There is an additional $100 charge for each OS/2 connection up to 500. An umbrella license targeted at large environments is also available for $750,000, with additional charges of $20,000 for the IBM, NCR, Stratus or Tandem host and another $20,000 for up to 5,000 attached PCs.

McGowan remembered

continued from page 1

ple business, political and regulatory challenges involved in opening telecommunications to competition. He was part entrepreneur, part lobbyist, part marketeer and part bulldog.

"Bill McGowan will go down in business history as one of America's foremost entrepreneurs," said Robert Allen, board chairman at AT&T. "He was a tough and colorful competitor. Probably more than any other single person, he helped reshape the business from a monopoly to a highly competitive industry."

After graduating from business school, McGowan made his mark on Wall Street, reportedly becoming a millionaire by helping financially troubled companies get back on track. He joined MCI in 1968 to help company founder Jack Goeken obtain badly needed cash and regulatory relief to build a microwave system between St. Louis and Chicago.

When McGowan entered the market, the seeds of competition had already been sown by such cases as the 1962 Carterphone decision, which gave equipment providers the right to connect devices to the Bell System network.

Gets ball rolling

But McGowan really got the competitive battle brewing. In 1971, despite vehement protests from AT&T, he convinced the Federal Communications Commission to grant MCI the right to compete with AT&T for long-distance services throughout the U.S. Two years later, he began complaining to the Department of Justice that AT&T was acting anticompetitively and violating the nation's antitrust laws.

In early 1974, MCI filed a lawsuit alleging antitrust violations, and in November of that year, the Justice Department itself filed a similar suit that eventually led to the breakup of the Bell System.

"McGowan, more than any other, was responsible for the government bringing the antitrust case," said Philip Verveer, the lead attorney at the Justice Department on the Bell antitrust suit. Verveer, now a partner with the Washington D.C. law firm of Willkie, Farr & Gallagher, said the Justice Department relied heavily on evidence McGowan had collected for MCI's suit.

McGowan's vision of what the market could be and his ability to assure government officials that competition would not result in disaster were critical factors in the Bell breakup, said Brian Moir, who was senior legal counsel for the U.S. House Committee on Energy and Commerce at the time.

"In the late '70s, the Bell System spent a tremendous amount of resources trying to snuff out the early [sparks] of competition," said Moir, who is now a partner with Fisher, Wayland, Cooper & Leader and counsel for the International Communications Association. "Without McGowan involved, it's difficult to understand how the effort would have been as successful."

Midas touch

Verveer agreed that McGowan's touch made the difference between success and failure for MCI. "In a pleasant way, you got the impression that he was a very tough and dedicated man and that he had very strong resolve to see the matter through to a successful conclusion," he said.

Robert Bennis, who was telecommunications manager for Westinghouse Electric Co. during the early days of MCI and one of the first MCI customers, also cited McGowan's personality as a key factor in MCI's success.

Initially, Westinghouse bought two microwave circuits from MCI in the St. Louis area. The lines were installed on a Friday, and Bennis returned to work on Monday to find, as McGowan had warned him, that AT&T had disconnected them.

"I wouldn't have [bought service from MCI] if I hadn't had someone like McGowan standing there like a rock to say, 'Look, we're not going to let you go down the drain,' " Bennis said. "Our necks were on the line.

"We were very unhappy with the autocratic posture AT&T took as the only kid on the block," Bennis said. "MCI was like a breath of fresh air. They came in with the attitude McGowan engendered in people that there's nothing that's not possible."

An impressive things about McGowan was he could make the transition from running a scrappy up-start to managing a multimillion-dollar, then multibillion-dollar, firm with seeming ease. Unlike many entrepreneurs, he was an able manager and received many awards from business organizations.

Verveer said one of McGowan's secrets to success was that he surrounded himself with excellent colleagues. "He was not afraid to have talented people around him," Verveer said.

Bert Roberts, who worked with McGowan for 20 years and is now president and chief executive officer of MCI, said McGowan valued other viewpoints (see "Roberts to take MCI helm," this page). "He was always one to hear out ideas and challenge those ideas with his own vision and breadth of thinking," Roberts said. "But he was never one to myopically dictate his own view of the world."

IBM to get new TCP/IP features

continued from page 4

processing environment."

Although FCS is capable of supporting text, voice, data and video, IBM officials stressed it is not designed for wide-area communications.

According to Phil Hester, vice-president of systems and technology for IBM's Advanced Workstation Division, there is some overlap between FCS and wide-area technologies such as Switched Multimegabit Data Service, but FCS is designed to be a local interconnect technology.

"This is for interprocessor communications," he said. "It allows high-speed connectivity between two devices."

Hester said the price of the FCS products would be "in the low thousands per node." He would not be more specific about pricing or availability. He also said the FCS cards might ultimately be available for personal computers as the cost comes down, but again, he would not provide further details.

FCS is now going through ANSI's standardization process.

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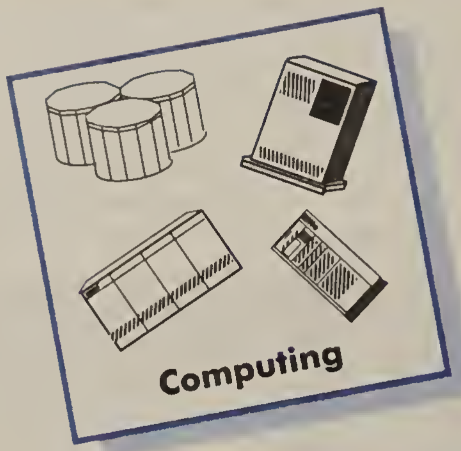

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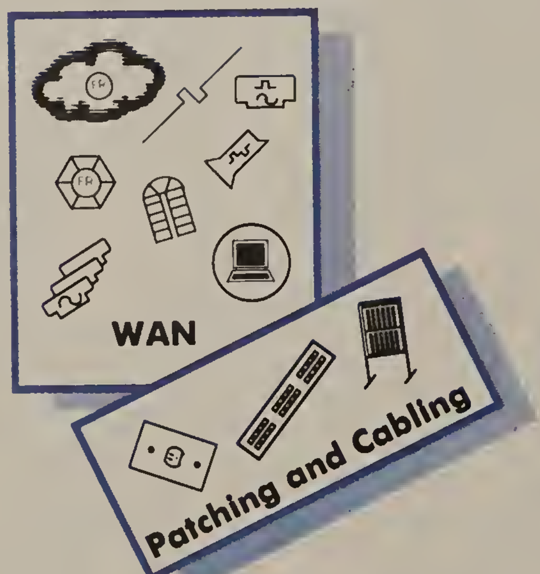

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Univel's Unix set for its debut

continued from page 6

Univel was formed last December to deliver to the market an extension of USL's 32-bit SVR4.2 that would give DOS-based NetWare users an easy way to integrate support for Unix platforms.

While USL has added a graphical user interface to Unix and made it more user-friendly, Univel has added value by porting various components of Novell's NetWare net operating system to it, said Roel Pieper, president and CEO of USL.

UnixWare includes Novell's Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) transport protocol, which enables Unix systems to communicate directly with NetWare servers instead of going through a Transmission Control Protocol/Internet Protocol gateway.

It also includes NetWare's Service Advertising Protocol, which informs clients about available server-based applications, and the NetWare Core Protocols, which are used to obtain services offered by a file server, such as printing.

UnixWare is designed to run on personal computers based on Intel Corp. processors and will ultimately be ported to Reduced Instruction Set Computing platforms. It will be available in both client and server versions.

The server version, UnixWare Application Server software, is designed to provide a high-powered Unix-based processing platform that can run applications downsized from host systems as well as applications that have outgrown DOS-based computers, Applebaum said. The systems will not replace existing NetWare servers because they do not run NetWare.

PHOTO ©1992 BILL O'CONNELL

Univel's Applebaum (l.) and USL's Pieper discuss UnixWare.

"There is a need for a general-purpose type of server in NetWare environments," said David Smith, director of Unix systems and software research at International Data Corp., a Framingham, Mass., market research firm. "It's much easier to write applications for UnixWare, which has a richer set of interfaces than NetWare."

The client UnixWare product is designed to give users a platform from which they can launch multiple applications, including those written for Unix, DOS and other operating systems.

"If all you want to do is run productivity applications, most people will stick with [Microsoft Corp.] Windows or [Apple Computer, Inc.] Macintosh," Applebaum said.

"Once you want to put on the desktop a custom application that requires security, robustness and an advanced file system," he said, "you're talking about the features application builders expect when they build to a mainframe, minicomputer or Unix environment."

Because UnixWare is based on Unix SVR4.2, it can run thousands of applications available for Unix computers based on Intel chips. It can also run DOS and Windows applications. But in an effort to spur development of products designed to take advantage of UnixWare's NetWare features, the company will offer an application development tool kit.

> "There is a need for a general-purpose type of server in NetWare environments," said International Data Corp.'s Smith.
>
> ▲▲▲

More than 70 developers have announced support for the software, including Borland International, Inc., Informix Software, Inc. and 3Com Corp. (see graphic, this page).

UnixWare, as well as many of the UnixWare applications, will be available this fall through Novell resellers. The product will cost between $500 and $1,000, Applebaum said. ▣

Univel teams with software, hardware developers

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Concord adds to Trakker

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help net managers take a closer look at the activities of certain nodes.

Group Summary lets net managers look at the usage patterns of entire user groups. The groups can be defined as users on a certain net segment or as logical groups that cross segment boundaries. Group Summary allows net administrators to explore what-if scenarios and helps them reconfigure their networks to better accommodate certain groups.

"We have a lot of people moving from location to location, and we need to understand their traffic patterns so we can make adjustments to the networks and server applications," Flack said. "The traditional approach has been to throw bandwidth at them. But this Trakker application lets us do a node-by-node analysis."

Chevron also needs to be able to look at node groups residing on all segments in order to plan net segmentation or isolation of certain groups, he said. By doing so, Chevron can find out if certain application servers need to be moved onto the same net segment as a certain user group. ▣

IBM to get new TCP/IP features

continued from page 4

interface. POSIX is part of the Open Software Foundation, Inc.'s and the X/Open Company, Ltd.'s standard for guaranteeing application portability among disparate Unix systems. IBM has promised POSIX compliance for its mainframe MVS.

The other major announcement this week will be the formal announcement of TCP/IP off-load technology for IBM's channel-attached 3172 Interconnect Controller. The Offload Facility works by moving TCP/IP processing from the mainframe to the 3172.

Following *Network World's* earlier report regarding the announcement, one IBM customer reevaluated plans to purchase a mainframe that would have handled TCP/IP processing, among other functions. The network executive told *Network World* his company has put a hold on a purchase order for a mainframe so it can examine IBM's new approach to TCP/IP processing.

IBM is expected to introduce a 3172 Model 3 that will handle the new off-load facility. No further details on the box were revealed.

IBM is also expected to enhance its ESCON architecture and roll out a new version of its mainframe VSE operating system this week. ▣

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